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## VIEWS, NEWS AND INTERVIEWS.

Mr. Samuel Insull, president of the Chicago Edison Company (and also president of the National Electric Light Association and the Association of Edison Illuminating Companies), has long been known as a low-tension advocate. Of late, however, he has found important use for high-tension current for transmission purposes in his extensive lighting work. The model station, known as the Harrison street station, Chicago, is one of the very large electric light stations in the country, and in its management, cleanliness and thorough equipment is unsurpassed. In this station a rotary transformer is put to a unique use. It was purchased to be used as a dynamo to give direct current off of one side of the armature and alternating current off of the collecting-rings on the other side, the idea being to feed an alternating-current system and a direct-current system from the same generating unit. The machine is temporarily used, however, to convert direct current into alternating, which is carried a distance of five miles at high potential, and is then, at the distant point, reconverted into a direct current and fed into a low-tension Edison network. This is done for the purpose of shutting down an entire station in a residential district 18 hours a day, which is the period of minimum load. This is the commencement of a scheme, we understand, which will be completed next year, which will result in shutting down four of the Chicago Edison Company's plants in suburban territory and concentrating the production of electric energy at the point where it is produced in the largest possible quantity, and consequently at the lowest possible cost; namely, the main station of the company at Harrison street.

A MODERN ELECTRIC KITCHEN.

A London syndicate, which owns the street railroad in the City of Mexico, has given instructions to convert the lines into electric railways at once.

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A Manchester, England, firm has produced a commutator in which the wearing portions of the segments are of aluminum, the projecting lug, to which the armature terminals are attached, being of copper. The absence of sparking and the consequent long wear are advantages claimed for the new departure, while lightness and cheapness are also points in its favor. In connection with the commutator an aluminum and carbon brush is used.

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The Baltimore & Ohio Southwestern Railway have made estimates for a period of several months, showing that the cost of turning a locomotive by an electrical device attached to the turn-table is less than one-half cent for each time the table is used, while if turned by hand the estimated expense of turning an engine is about 12 cents.

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The Metropolitan Street Railway Company last week paid into the New York city treasury its annual car license and franchise fees, amounting to $200,000. The company pays $150,000 a year for the Broadway cable road franchise.

### A Modern Electric Kitchen.

In the Duane street station of the Edison Electric Illuminating Company, of New York, has been arranged a complete electrical kitchen, which is presided over by a skilled *chef*, who serves electrically cooked luncheons for the officials and heads of departments of the company. It is done by the Edison company largely with the view of illustrating the practicability of the electric system of cooking.

The electric ovens are brought to the desired heat in a very short time, and a uniform degree of temperature is easily maintained, so that the cooking process requires less time than by the ordinary heat direct from coal. For boiling vegetables, sauces, etc., special stew-pans and pots are utilized which are attached by means of a plug to the circuits and are operated independently, so that as varied a *menu* as may be desired can be prepared by merely attaching broilers and kettles to the service circuits. The kitchen is fitted with stone slabs for the cook's work, a white-tiled sink with hot and cold water, and in the corner, standing close against the largest piece of cooking apparatus, the electric ovens, is the refrigerator, the radiation of heat being so slight as not to effect the ice in close proximity. "This beats my old coal kitchen, for I have no ashes nor dirt, and when the heat is wanted it is there.

"It cooks in two-thirds the time that would be needed in an ordinary

stove," said the *chef*. "I can bake a loaf of bread in 16 minutes, a pie in nine minutes and biscuits in four minutes;" and he added, "your fire won't die down so that you must put fresh coal on, which deadens it for a spell and then gives too much heat."

The apparatus used is that manufactured by the American Electric Heating Corporation, of Boston, who have done much to advance the art of cooking by electricity.

One of the officials of the Edison company said that current for electrical cooking at consumers' rates costs slightly more than fuel for coal stoves, but the economy was in the fact that work is done in less time with the current, and the heat is generated only when desired for service, ceasing the instant it is turned off; but that it had great advantages in cleanliness and ease of management, which would soon bring it into more common use.

## CHICAGO NEXT JUNE.

### THE NATIONAL ELECTRIC LIGHT ASSOCIATION.

A specially called meeting of the executive committee of the National Electric Light Association was held at the Holland House, New York city, Monday evening of this week. Among those present were President Samuel Insull, of Chicago; Vice-president A. M. Young, of Waterbury, Ct.; Secretary George F. Porter, of New York, James I. Ayer and Fred A. Gilbert, Boston; Geo. R. Stetson, New Bedford; W. Worth Bean, St. Joseph, Mich.; W. McLea Walbank, Montreal; E. H. Stevens, Elizabeth, N. J.; A. J. DeCamp, Philadelphia; John A. Seely and Geo. A. Redman, Rochester; Judge E. A. Armstrong, Camden, N. J.

A great deal of routine business was transacted and the affairs of the association showed to be in a very prosperous condition. It was decided to hold the next annual meeting at Chicago during the month of June, 1898.

## Suit for Royalties.

Trial of a suit brought by Luther Stieringer against Richard N. Dyer and George M. Maitland to recover $25,000 alleged to be due on royalties on an electric fixture patent was begun before Justice Pryor in the Supreme Court on Monday of this week. Mr. Stieringer asserts that in 1881 he entered into an agreement with Messrs. Dyer and Maitland, under which he was to receive royalties.

## PERSONAL.

Mr. J. M. Clark has been elected president of the Chicago Telephone Company, to succeed Mr. R. T. Lincoln, resigned.

Mr. William H. McKinlock, the former president of the Metropolitan Electric Company, and Mr. W. C. Camp, of the same company, were visitors in New York city last week. Before returning West they spent a few days in the electrical circles of Boston.

Mr. Charles S. Knight, of the Fort Wayne Electric Corporation, was a New York visitor on Thursday of last week. He reports great activity in manufacturing circles. The Fort Wayne company is very busy filling orders, and has a great many booked ahead. Reports from the West generally indicate a very active business in the electrical field.

## TWENTY-FIVE YEARS' PROGRESS IN INCANDESCENT LIGHTING.*

BY J. W. SWAN, F. R. S.

Progress in incandescent lighting can hardly be said to extend so far back as the date of the establishment of the *Electrical Review*. At that time, if any progress had been made, it was of an extremely slow and halting kind, and several years had to pass before the point was reached when incandescent lighting began to make headway.

In 1872, though many abortive attempts had been made to realize the idea—not only was there then no practical incandescent lamp, but there was no expectation or faith among scientific men in the probability of such a thing being produced.

It was a time of great activity in matters electrical; much had been done, and much was being done in the way of approach from many converging directions on the point towards which we are looking.

An immense impulse had been given to inventions for the utilization of electricity by the demonstration in a most practical form of the fact that motive power was a highly economical means of generating electric current. Gramme and Siemens, not to speak of others almost equally active in the same field, had each made their contribution towards the evolution of the dynamo; and inventive minds were being directed to its improvement, and busily at work on the means of its practical application. The development of light by means of the electric arc was the thing chiefly aimed at. Great improvements were being made in arc lamps, and there was marked progress in the use of arc lighting.

But it was evident that however perfectly the arc lamp could be made to operate, there would still be a very wide field left vacant, which could only be filled by a smaller and milder illuminant, of which an incandescent lamp was the ideal. The idea was by no means new, for Grove had propounded it in 1842, though not in a useful form. In 1845 Staite improved upon the elementary idea of Grove, and Starr, about the same time, went a good deal nearer a practical invention of the kind; he made a lamp having two of the characteristic features of the modern incandescent lamp—the light-giving body of his lamp being carbon, and the carbon in a vacuum.

These early experiments and others of a similar kind bring us up to the year 1872, and they had not brought forth an efficient and practical incandescent lamp. The lamps with metallic conductors, like Grove's, did not give sufficient light for the power expended, and the carbon lamps of the design of Starr were cumbrous, costly and radically defective. And for the rest of the carbon lamps acting on the principle of incandescence invented up to this time, the means used for the production and maintenance of the vacuous space in which the carbon was heated were inadequate to meet the extremely exacting requirements of an economical and durable lamp.

The truth of the saying that "necessity is the mother of invention" is well illustrated by the circumstances and incidents which attended the evolution of the incandescent lamp; the want was so obvious and the necessity so urgent, as to strongly stimulate fresh effort to overcome the technical difficulties which alone stood in the way of its successful production. Happily, some of these were opportunely smoothed away by previous and concurrent invention, discovery and suggestion.

Sprengel had, in 1865, by the invention of his admirable mercury pump, put into the hands of physicists an improved means of obtaining high vacua, and Crookes, in connection with his radiometer research in 1877, showed how effective it was capable of being made, and in the radiometer bulb he accidentally suggested the bulb of the modern glow lamp.

The experimental work which had been actively carried on both here and in America since 1877, culminated in 1880 in the establishment of the incandescent lamp manufacture on a commercial basis, and on the same general lines along which it has, up to the present time, been developed and extended all over the world.

The history of this development and extension coincides with the development and extension of electrical engineering, and with that of the great industrial use of electricity, which is one of the striking features of the time, and is largely the outcome of the success of the incandescent lamp.

The technical progress in incandescent lighting since 1880 has been very great—the commercial progress has been even greater. Perfection was not reached in one stride, either in the design or workmanship of the incandescent lamp. Increased skill, the result of experience, led to general improvement, and as time went on important structural changes were made tending to the elimination of early defects. The connection between the carbon filament and the leading-in wires was greatly improved by the electro-thermal deposition of carbon at the points of juncture, and the material out of which the filament itself was made was much improved. It is now more uniform and in every way better than it was formerly, with the result that lamps of smaller candle-power for high voltage can be made than was possible 10 years ago; also the amount of light per watt has been materially increased. Whereas, at the outset, an efficiency of one candle for three and three-quarters to four watts was considered a fairly good performance, now it is practicable to obtain this amount of light with 25 per cent less watts; of course, it is only possible to take full advantage of the higher efficiency in the exceptional cases where the voltage is uniform.

Another direction in which there has been wonderful development has been in the variety of the lamps. From the simple eight and 16-candle-power lamps of the early days of the manufacture, the types have increased to many hundreds, with varying powers, from the tiny glow-worm spark of the microscopic surgical lamp to the monster of a thousand candles. What with fairy lamps, lamps for scientific and theatrical purposes, lamps for advertisement and for signaling, lamps bright and lamps frosted, lamps colored and lamps clear, lamps of plain forms and lamps of fanciful forms, one is apt to be bewildered by the variety.

(To be concluded.)

* From the London *Electrical Review*

## Electric Lighting in Omaha.

A notable change is about to be made at Omaha, Neb., where the new Omaha Thomson-Houston Electric Light Company is undertaking the concentration of its station. It has recently placed an order with the General Electric Company for three monocyclic alternators, each one to be directly connected to a compound condensing engine. These alternators will be revolving armature, 48-pole machines, each of 300 kilowatts at 150 revolutions and will be separately excited. They will take the place of a considerable number of smaller machines and will be used to furnish current to an extensive system of three-wire secondary mains fed from large transformers.

## Walker Company Sold.

A dispatch from Cleveland, Ohio, dated November 21, says that an eastern syndicate, including ex-Governor Flower, J. W. Hinkley, Anthony N. Brady and Perry Belmont, of New York, have purchased the entire property of the Walker Company, including all the stocks and bonds. The Walker Company has extensive factories and foundries in Cleveland. For the last year the company has been building a large type of electric railway and electric lighting apparatus. The men who have made the purchase have been stockholders in the company for a short time. They now become the majority stockholders.

## Police Telegraph Executive Committee.

The executive committee of the International Association of Fire and Police Telegraph Superintendents met at Elmira, N. Y., last week. A number of gentlemen met with president W. T. Ellett, of Elmira, at 6 A. M. Sunday, and transacted considerable routine business. Afterwards the entire party visited Watkin's Glen, and enjoyed a delightful outing. Among those present were: Frank C. Mason, of Brooklyn; Geo. T. Manson, of Montclair, N. J.; Adam Bosch, of Newark, N. J.; John Aydon, of Wilmington, Del., and nine others, making the lucky number of 13 in all in attendance.

## Thanksgiving.

On Thursday of this week the United States celebrates Thanksgiving. The ELECTRICAL REVIEW, its editors, printers and correspondents will observe the day.

One of our esteemed patrons, the Central Electric Company, of Chicago, calls attention in an unique and proper way to the day. What it says is worthy of most careful consideration.

The paper on "Municipal Ownership and Operation of Street Railways," by Mr. P. F. Sullivan, now appearing in the ELECTRICAL REVIEW, contains data collected from world-wide sources, and merits the attention and thought of every electric railway man.

### The Effect of Rains On Underground Trolley Systems.

The behavior during flood times of an electric street railway, operated on the General Electric open conduit system, such as the Metropolitan Traction Company, of New York, is so extensively laying down, is of interest to the public. Ignorance of it has formed one of the principal motives for decrying it. While no flooding of the conduit has ever occurred on the Lenox Avenue line, it has been averred that, if it were flooded, traffic would necessarily stop, owing to short circuit, until the water had been run off. That this is not the case is shown by an interesting experience on the line of the Metropolitan Traction Company in Washington, D. C.

October 9, 1897, as the result of a heavy rain storm, a stretch of track some 150 feet long on the F street line became completely flooded, the water filling and overflowing the conduit, as it was unable to run off by the usual sewer connection, which was cut off. According to the statement of Mr. Weaver, president of the road, although the conduit was completely filled with water for nearly two hours, the station was not short circuited, nor were the water rheostats called into requisition. The normal load of the feeder for the section is 300 amperes; the load during the time the conduit was flooded was 600 amperes, and the cars were also operated on the sections on both sides of that which was under water. The water was practically pure, and this partially accounts for the small additional load.

The Washington electrical conduit system, although its conduit has been several times flooded, has never yet been tied up, except once when the water almost covered the floors of the cars and flooded the motors. At other times the line has been operated by means of a reducing rheostat. The present instance is the only one in which the flooded section has been operated directly from the generators without reducing medium. It was estimated that the pressure of the current on the cars in the center of the flooded portion was about 250 volts.

### Telephone Subways in Syracuse, N. Y.

The main subways of the Central New York Telephone and Telegraph Company in Syracuse will be completed in about one month. Two miles of this is now completed and work is being pushed to completion as rapidly as possible. The largest subway of all is the one in East Fayette street. This is 12 feet under ground and contains 34 ducts. The work of placing the wires in the ducts will probably not be undertaken before next Spring. This is one of the big tasks which confront the telephone company, and will be a large expense. The Hughes's subways are also down in the business streets, but it is not known by the public, at least, just what use they are going to be put to. This latter company has laid on the principal business streets subways for telephone wires on one side of the street and electric light on the other.

### A Telephone Dinner.

Fraternal feeling is proverbial among telephone men. A rare feast was enjoyed by the favored guests of Mr. H. F. Stevens, of the New York & New Jersey Telephone Company, at the dinner given by him on Thursday evening of last week at the Crescent Club, Brooklyn Heights. Mr. Stevens entertained his friends in one of the private dining-rooms of this club. The table was beautifully decorated with Catherine Mermet roses. Each guest was presented with a *boutonnière*. The following well known gentlemen were present: Messrs. W. D. Sergeant, J. C. Reilly, Henry Sanger Snow, A. L. Salt, H. G. McCully, and H. T. Richards. Some of the guests being noted epicures, the task of serving such fastidious palates was not inconsiderable, but with the aid of the club's efficient steward Mr. Stevens was enabled to present some delightful surprises in the way of new dishes. The dinner was altogether a success.

### Chicago Edison Company.

A press dispatch from Chicago last Saturday states that the Western Light and Power Company, of Chicago, has been purchased by N. W. Harris & Company, representing, it is understood, the Chicago Edison Company. For the first 16 days of November the current output of the Chicago Edison Company shows an increase of 25 to 30 per cent.

### New Boston Telephone Exchange.

On the first of November the New England Telephone and Telegraph Company opened its new central office in the Back Bay district of Boston, 208 Newbury street. This office is in the residential portion of the city, and is intended to care for an ultimate number of 3,500 subscribers' stations.

FIG. 1.—INTERIOR VIEW OF THE NEW BACK BAY, BOSTON, TELEPHONE EXCHANGE.

There are now connected with the office about 1,000 stations.

The switchboard of this office is of the recent type known as the "Major relay board," the signals are entirely automatic and are in the form of small lamps. The operation of the board is exactly the same as that in the city of Worcester, which was the first multiple board built on these lines, and which has proved extremely satisfactory in its two years' service.

There will be no local battery at the subscribers' stations, current for talking being supplied from the Central Office.

FIG. 2.—POWER SWITCHBOARD IN THE NEW BACK BAY, BOSTON, TELEPHONE EXCHANGE.

Two illustrations are presented on this page of the ELECTRICAL REVIEW. One of these shows the telephone switchboard with the operators at work, and Fig. 2 is from a photograph of the power switchboard.

This Back Bay exchange is looked upon as one of the most pleasantly located and most modernly equipped of any exchange in the country. The building is five stories, and was formerly a very handsome residence, and was well adapted for the changes necessary to make a modern telephone exchange of it. The most important remodeling occurred on the upper floor, large skylights being put in, and the different apartments made into one. The manager of the exchange is Mr. Frank Herzig, the entire system being installed under the personal supervision of Mr. I. H. Farnham, electrical engineer of the New England Telephone and Telegraph Company.

The method of operating this new board is known no doubt to many readers of the ELECTRICAL REVIEW. The principal improvement over other switchboards is the introduction of minute electric lights for signals to the operators. Each one of the young ladies serving in that capacity has a certain number of subscribers to attend to. On the face of the board before her are rows of holes called "jacks," with a small eye of ground glass under each. When a subscriber takes his telephone from the hook to give a call the little glass eye lights up. The usual arrangement of switchboards is for a signal by the dropping of a little metal disk, but the tiny lamp does away with all that, catching the eye more quickly and with far more certainty. On the table before the operator are other rows of glass eyes, and when she rings up the number asked for, the individual eye among them corresponding to her call is illuminated. If her ring is answered and the desired connection made by putting the "plug" in the "jack," the two lights go out, showing that everything is all right and as it should be.

And even with this the mission of the lamp is not ended.

In each operator's section just above her head is a single glass eye, perhaps half an inch in diameter, called a "pilot light." If a wrong connection is made, or there is one of those delays sometimes unavoidable, but always so aggravating to the subscriber, the solitary eye comes to sudden life with a glare that tells the chief operator or manager that something is wrong.

The floor below the exchange room is arranged for lunch and toilet rooms for employés. Handsome fireplaces and mantels and richly carved woodwork have been left in the handsome residence and gives it the appearance of a beautiful home. The employés greatly appreciate these pleasant surroundings. The basement and lower part of the building are occupied by storage batteries, cable terminals, lightning arresters, and the electrical apparatus generally that is required in a modern telephone exchange.

### Long-Lived Steel Rails.

In tearing up a siding on the Straitsville Division of the Baltimore & Ohio Railroad the other day, the section men discovered that several of the rails had been made in 1863, says a contemporary. Subsequent investigation revealed the fact that these rails were part of a lot that were bought in England during the war at a cost of $125 per ton in gold. The rails were still in very fair condition, and for light motive power might last 10 years longer.

# TELEPHONE NEWS AND COMMENT.

John B. Corp has brought suit against the American Telephone and Telegraph Company, of Columbus, Ohio, for $10,000 for injuries sustained while in the employ of the company.

The Adrian, Mich., Telephone Company is building a line to Rome Center, Springville and Onsted, and a line from Toledo, by way of Fayette, Wauseon and Morenci, will be ready for use shortly.

The statement of the Mexican Telephone Company for September is as follows: Gross, $10,710; increase, $335. Net, $4,687; increase, $406. For seven months: Gross, $73,872; increase, $2,508. Net, $28,074; increase, $7,500.

T. B. Doolittle, of Boston, special agent of the American Bell Telephone Company, was in Houghton, Mich., last week arranging for the extension of the long-distance telephone system from Detroit to the copper district via Sault Ste. Marie.

The Maryland Telephone Company has entered into an agreement to connect with the Winchester Telephone Company, which has consolidated with the Martinsburg company. By this agreement the Maryland will form a connection with Baltimore, Washington, Hagerstown and other points.

A deal has been closed whereby the Southwestern Telegraph and Telephone Company absorbs the Mutual Telephone Company, of Corsicana, Tex. The property of the Mutual Telephone Company falls into the hands of the Southwestern people on December 1. This is the last one of the telephone companies established to do business in opposition to the Erie telephone system in Texas.

A new telephone company, to be known as the Chicago & Northwestern, with a capital stock of $250,000, is to build lines from Milwaukee, over eastern Wisconsin and northern Michigan, and connect with the Wisconsin Valley Telephone Company's lines at Eau Claire. The Wisconsin Valley company's plans will cover about 1,600 miles of lines in the territory bounded by the Twin cities and Winona on the west, Ashland and Superior on the north, Wausau on the east and Madison on the south. New exchanges are to be put in at Eau Claire, Chippewa Falls, Stevens Point and other places.

The Citizens' Telephone Company, of Florence, Ala., made an assignment on November 9 to President M. B. Shelton, of the Merchants' Bank, and on November 11 Mr. Shelton sold the assets of the company and the exchange was closed. The company was started about eight months ago, and the cause of the failure is given as the fact that the rates charged were too low. It is understood that the oreditors will receive about 60 per cent of their claims. The stockholders will sustain a total loss. The failure of the company leaves the local Bell company in possession of the field. It is also understood that the Bell company will give Florence connection with the long-distance service.

The New England Telephone and Telegraph Company has recently completed the purchase of the stock, franchises, good-will and plant of the Vermont Telephone and Telegraph Company, which has heretofore been operated under the control of Mr. A. C. Brown. The company's territory covers the entire counties of Lamoille and Washington, and also extends into five other counties of Vermont. Mr. Brown organized the company in 1880 and opened a telephone exchange in Montpelier. The plant now includes seven exchanges located in Montpelier, Barre, Morrisville, Waterbury, Hardwick, Underhill and Cambridge. The plant also includes nearly 5,000 miles of wire, and between 600 and 700 telephones. The New England Telephone and Telegraph Company assumed the Vermont company's business, beginning November 1. The New England company now controls the telephone business throughout the state of Vermont.

## ELECTRIC RAILWAY NOTES.

The Augusta, Ga., Street Railway Company will expend $25,000 in improvements to its electric plant, etc.

The Savannah, Ga., Thunderbolt & Isle of Hope Company will expend $50,000 in improving its trolley system.

People's Electric Railway Company, Sandusky, Ohio, has decreased its capital stock from $100,000 to $50,000.

It is expected that the electric railroad to be built from Ludington, Mich., to Hesperia, will before long be extended to Newaygo and Cedar Springs.

The town trustees of Hobart, Ind., have accepted the proposition of John P. Dales & Company, of Crown Point, for the construction of waterworks and an electric light plant, at a cost of $20,500. Work will begin at once.

The South Side Rapid Transit Company, of Chicago, Ill., will build a paint and repair shop at 1044 to 1052 Sixty-first street, to cost $19,000. The building will be two stories in height and will be constructed of brick.

Articles of incorporation of the Skaguay & Lake Bennett, Alaska, Tramway Company have been filed. The company has an alleged capital of $250,000 and proposes to build and operate a railroad or tramway over White Pass.

Messrs. Wm. H. Brine, Horace B. Taylor and Wm. B. Arnold, of Boston, will petition the Massachusetts Legislature for incorporation to build and operate an electric road from Plymouth to Sandwich, through Bourne, to carry passengers, freight, mails and express.

The City Passenger Railway Company, of Baltimore, Md., has decided to change its Red and White lines from cable to electric lines. Application has been made to the city commissioner for permit to erect the necessary poles to equip these lines for operation by electricity, and it is the intention of the company to begin work as soon as possible.

The syndicate which contemplates the construction of an electric railway from Rockford, Ill., to Dixon, has purchased the franchise and right of way owned by James S. Bicknor, of Rockford, and it is announced that the road will be built in the Spring. Attorney Hopkins, John Farson, of Chicago, and Congressman Aiken, of Flint, Mich., are interested in the project.

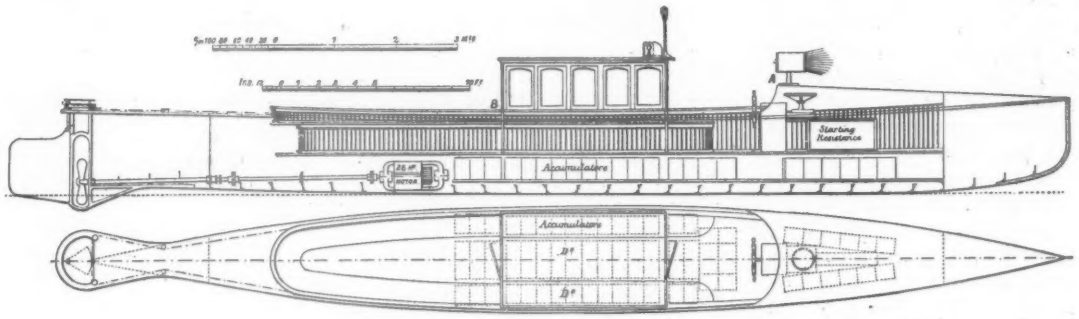
The Buffalo, N. Y., Railway Company's earnings for the quarter ended September 30, show a large increase over the earnings for the same period a year ago. The G. A. R. Encampment, of course, swells the figures here presented:

| | 1897. | 1896. |
|---|---|---|
| Gross earnings | $378,875 | $378,030 |
| Operating expenses | 176,240 | 164,077 |
| Net earnings | $202,635 | $183,962 |
| Other income | 5,888 | 5,957 |
| Total | $208,523 | $189,919 |
| Fixed charges | 108,344 | 105,187 |
| Surplus | $100,179 | $84,812 |

The report of the Troy, N. Y., Railway Company for the quarter ended September 30, shows an increase in gross earnings of $3,757 over the corresponding quarter last year; a decrease in operating expenses of $3,638; an increase in net of $7,395; an increase in total net of $7,344; a decrease in fixed charges of $188, and an increase of $7,531 in surplus. Since January 1, the gross earnings have been $403,821, against $389,680 in 1896, and the net, $185,825, against $183,625.

### The Dutch Electric Launch "Plante."

In the illustrations herewith are shown a plan and elevation of the electric launch "Planté," constructed by Messrs. L. Smit & Zoon, shipbuilders, Kinderdijk, Holland, with which a fairly high speed has been attained. The launch measures 52.5 feet in length by 5 feet 7 inches wide by 3 feet 11 inches deep. The hull is of steel, whilst the cabin and joiner work generally is in teak. As will be seen, a searchlight is placed on the bows, and the current is also used for cabin lighting with incandescent lamps. The cells, 80 in number, are placed under the floor. They are of the Tudor-Planté type, and were supplied by the Accumulatoren Fabrik, of Hager, who guarantee them to give an output of 30 effective horse-power for one hour with a motor having an efficiency of 82 per cent. With the motor actually employed the efficiency is higher, so that 35 horse-power can be obtained for an hour. The containing cells are of ebonite. With a slight overload of both battery and motor, the load is capable of giving a speed of 11.8 miles per hour. The motor gives, in normal working, 25 horse-power, and weighs 2,100 pounds. By placing the battery in two groups of 40 cells each in parallel, the voltage at the motor terminals is reduced to 80, and under these conditions eight horse-power is developed, which suffices for a speed of 7.47 miles per hour. This rate can be maintained without recharging for seven and one-half hours. The starting resistances are used only for bringing the motor up to speed, in slowing down for a stop, and in reversing. The motor is of the four-pole type, two of the poles only being series wound. The field magnets consist of a steel casting, which also forms the frame of the machine. The thrust of the propeller is taken on a ball bearing, which, so far, has given excellent results. The motor and the electrical fittings have been supplied by the Electrotechnische Industrie, of Slikkerveer. We are indebted to London *Engineering* for the illustrations and the above particulars.



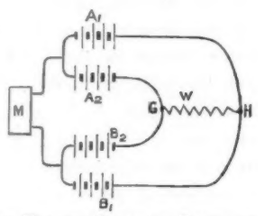

THE DUTCH ELECTRIC LAUNCH "PLANTE."

### Electric Light Improvements in Adams, Mass.

The Adams Electric Light and Power Company is preparing to put in a new machine, capable of 1,500 lights. The company intends to extend its line over Hoosac, Summer and the streets on Morningside. The work of overhauling will commence soon.

### Wall Street and the Electrical Stock Market.

recently an electrical discoveries. of converting alternating into direct currents, devised by L. Grœtz. The working of Grœtz's apparatus depends on a peculiar property of aluminum when used as one of the electrodes of an electrolytic cell. When an aluminum plate forms the anode of the cell, it is found that a current is stopped if the electromotive force does not exceed 22 volts, but comparatively little resistance is offered to the passage of the current in the opposite direction. Platinum or carbon may be used for the other electrode. We have, therefore, in the aluminum carbon cell a sort of non-return valve, which will resist a back pressure of 22 volts. By joining a suitable number of these cells in series, any desired pressure can be resisted. By means of four of these valves the currents of an alternator can be converted into pulsating direct currents, the valves being arranged in a similar way to those of a double-acting pump for air or water. An apparatus designed by Grœtz on this principle is shown in the figure. One pole of an alternator M is connected to two aluminum-carbon bat-




An Electro-Chemical Rectifier.

teries $A_1$, $A_2$, arranged to allow currents to pass in opposite directions, the other pole of the alternator being connected to a similarly arranged pair of batteries $B_1$, $B_2$. These four batteries are connected up, as shown, to the terminals G, H of a conductor W, in which the direct current is to be produced. With an apparatus constructed on the principle just described, and supplied by a small alternator, Grœtz was able to drive a continuous-current motor intercalated in the wire W, and also to deposit copper and produce other effects obtained from direct currents. He estimates, on theoretical grounds, that the loss of energy does not exceed four to five per cent—a much too favorable estimate, we reckon. Grœtz considers that this peculiar non-return action of the aluminum electrode is a condenser effect. When the aluminum plate is the anode, a layer of oxygen or some other union is formed on it immediately after the current starts, and acts as a thin layer of dielectric to separate the charge on the aluminum plate from the charge on the liquid surface opposite the plate. A very small part of the effect, he thinks, is due to polarization.

---

It is understood that the Newton & Boston, Mass., Street Railway Company for the fiscal year ending September 30, showed an increase in gross earnings of 45 per cent.

100 shares were traded in in Boston during the week. Officers deny that the company has been buying in the preferred stock. In this connection it may be well to remember that a illustration shows the regarding full size. It was made to be w[illegible]

The Smallest Electric Motor, Exact Size.

a scarf-pin by Mr. D. Goodin, a jeweler and watchmaker of McKinney, Tex. It weighs, complete, one pennyweight and three grains. The front of the motor is of highly polished gold, and the commutator segments are also of gold. Viewed from the front the motor presents only a gold appearance. The field magnets are made of two thicknesses of No. 22 sheet-iron scraped down and polished. These are held together with gold screws, and wound with No. 28 silk-covered wire. The armature is of the four-pole type, and is wound with No. 36 wire. The little brushes are of hammered copper, and are, of course, very thin. There is a small gold switch on a black rubber base, made with a pin, to be worn on the lapel of the vest. A small chloride of silver battery, carried in the vest pocket, furnishes current for the operation of the little machine. The motor runs at a very high speed, and its humming can be distinctly heard by any one standing near the wearer. This very interesting machine is now on exhibition in Mr. Goodin's store.

---

An exposition of calcium carbide, acetylene generators and lamps will be held in Cannstatt, Germany, in February next.

### The Heilmann Electric Locomotive.

[*From the Railroad Gazette.*]

Last Saturday a special dispatch reached New York saying that a trial of the Heilmann locomotive had been made on the Western Railroad of F[illegible] day before; that a run time and [illegible]is to Nantes (269 vising the most st[illegible] 200 tons illumination, and in many [illegible]nd the results are really artistic. of the chief drawbacks in electrical illuminations of this kind has been the necessity of having some one turn off the lights whenever the streets had become deserted, be this hour 10 or 12 o'clock or later. However, watchmen are not infallible; they may let the lights burn for hours when no longer needed, and then forget to turn them on in the early morning hours. To overcome these difficulties, the time-switch, here illustrated, was designed, and is now being placed on the market by the Western Electric Company. A weatherproof iron box contains an accurate clockwork, so connected to a rotary switch that at any hour desired the switch will automatically turn off the current, and, if desired, close the circuit again at any later hour. It can also be arranged that, in cutting out the lights, a night circuit, or, in fact, any desired lamp or lamps, will be left burning. This does away entirely with the necessity of depending upon the watchman or engineer, and where they are employed especially for that purpose, saves, of course, that much in wages.

This switch is a double-pole, 30 ampere snap switch with a capacity up to 220 volts.

Where central stations are selling light by contract to burn to specified hours, these automatic time-switches can be installed by the electric light company, and the inspector may carry a key to the switch. By this means the company can be assured of having the light turned off at the time specified in their contracts with customers. If the customer has a meter and desires to keep his store illuminated until a certain hour, he can, with perfect assurance, lock his door and leave the automatic switch to take care of the lights, knowing that he is not dependent upon the service of any watchman, and that his lights will not be taking current and a bill run up on account of lack of attention.

A New Time-Switch.

### CHICAGO NEWS NOTES.

The American Electric Telephone Company reports the closing of several good-sized contracts for exchange equipments, and, to judge from the many places mentioned, it seems that American apparatus is fast becoming known in every corner of the states.

The Farr Telephone and Construction Supply Company, who some [illegible]me ago issued a new edition of its [illegible]ing [illegible]id telephone catalogue and J. F. Mackie [illegible]ports that the demand presidents, R. P. [illegible]ely increased, Niagara Falls, Ontario; Reeve[illegible] F. E. Dalton, Niagara Falls, sout[illegible] E. Norden, J. Harrison Pew, Stamford; James D. Hazlett, Reeve A. Herbold, Chippewa; Mayor Griffith, S. J. Sidey, Welland; secretary-treasurer, Fred W. Hill, Niagara Falls. Executive committee, W. Cole, George Henan, J. B. Stephens, A. Gray, of Niagara Falls, Ontario; Thomas Berriman, John Soules, P. S. Clark, C. D. Emmett, of Stamford; J. G. Cadham, E. Fisher, H. C. Symmes, and D. Thompson, of Niagara Falls, south.

---

### The Cinepantograph.

A St. Louis press dispatch says that Thomas Vassell, an English artist residing there, claims he has discovered a method of modeling clay by automatic process. The subject for model stands before Vassell's apparatus just as for a photograph, and the result is an exact model in the clay. "My new apparatus I call a cinepantograph," says Mr. Vassell, "for the reason that it is based upon the principle of a pantograph, but is electromotive, and, instead of the pencil which traces the picture to be reproduced by the pantograph, the cinepantograph is furnished with plaster and a delicately pivoted tracer, which moves with electric speed and mathematical accuracy over the features of the model to be reproduced. As it moves, the tool at the opposite side of the pantograph attachment moves in sympathy."

---

### Shipping Cattle by Trolley.

Stockmen in the neighborhood of Mason City, Iowa, are shipping cattle over the Mason City and Clear Lake Electric Railroad, a trolley line recently constructed between the two points for the handling of such business. The road is 17 miles long, and passes within a stone's throw of many of the best farms in Iowa. At Mason City the stock is transferred to regular stock trains for the eastern market. Other lines will probably soon be built northwest from Mason City to Fertile or Lake Mills, and southeast through Coldwater to Rockford. A line is already planned from Charles City to Hampton and from Clear Lake to Belmond.

---

The New York State Railroad Commission last week granted the application of the Metropolitan Street Railway Company, of New York, for permission to use the underground trolley on its 86th, 106th and 125th street lines.

# TELEPHONE NEWS AND COMMENT.

John B. Corp has brought suit against the American Telephone and Telegraph Company, of Columbus, Ohio, for $10,000 for injuries sustained while in the employ of the company.

The Adrian, Mich., Telephone Company is building a line to Rome C[illegible]ter, Springville and Onsted[illegible] line from Toledo, by Wauseon and M[illegible] for

TELEPHONE CALL.

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*Telephone-Harrison, 475.*

LONDON OFFICE:
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## Special Notice to Advertisers.

*CHANGES for advertisements must be in this office by Friday noon for the following week's issue.*

*NEW ADVERTISEMENTS should be in the office not later than Saturday noon to insure publication the following week.*

NEW YORK, NOV. 24, 1897.

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We congratulate the London *Electrical Review* on its twenty-fifth anniversary, which was celebrated in a meritorious special issue dated November 12, 1897. Twenty-five years covers a great deal of history in the electrical field, and it has been the privilege of our esteemed contemporary to chronicle all the important commercial and technical developments of the art. We present our compliments to our British namesake.

The New[illegible] height and will be constructed of brick.

Articles of incorporation of the Skaguay & Lake Bennett, Alaska, Tramway Company have been fil[illegible] The compl[illegible]aint was handed [illegible] a suit brought by John Jenkins against the Brooklyn Heights Railroad Company to recover $10,000 damages for alleged false arrest and imprisonment. The suit involved a transfer ticket. The plaintiff admitted that he had presented the transfer after the time limit stamped on it had expired. When called upon to pay his fare he refused and was ejected from the car. He was then arrested, but was discharged in a police court. The railroad company, through its counsel, said that the reason Mr. Jenkins was arrested was because he had created a disturbance on the car. In dismissing the suit, Justice Dickey said that the company only issued transfer tickets as an accommodation and a convenience to their passengers, and they had a right to make rules regulating the transfer tickets and to limit the time when the tickets could be used. He said the plaintiff was not entitled to ride without the payment of a fare, and therefore the conductor properly took steps to eject him. The plaintiff, he said, might have had an action for the recovery of five cents fare, if it had been paid, but he had no right to remain and seek violence.

### *MODERN TELEPHONY.*

When a telephone company of the magnitude and importance of the New York Telephone Company makes a net gain in its subscribers' list of almost 23 per cent in less than one year, the fact is worthy of more than passing notice. Such is the case, and the reasons, we believe, will be found in improvements in the service and in the equitable adjustment of telephone rentals, notably apparent in the message rate system, which has proved successful both for the subscriber and the company, not only in New York city, but wherever adopted.

Another great improvement made in the handling of the New York Telephone Company's traffic is the introduction of visual signals on trunk lines. By this means the operator can see and work without depending on the receipt of a verbal order, and can therefore work more expeditiously. The company has expended in this improvement alone something like $40,000 during the past year.

We think it is admitted by all telephone men that the plant of the New York Telephone Company stands in the front rank both as to the magnitude of its operations and the ease and satisfaction with which they are performed. This fact is recognized in foreign countries. The Japanese gov-

### The Dutch Electric Launch "Plant[illegible]"

In the ill[illegible] shown [illegible] and the United [illegible] inspecting the New [illegible] city telephone system, these commissioners decided to adopt the American practice and methods, and placed an order with a well known telephone manufacturing company for a plant to cost $9,000,000. This is certainly the acme of praise for American telephony.

### *A SWEEPING TROLLEY DECISION*

Last week the New York State Court of Appeals rendered a decision in what is known as the "Kingston traction case" of such a sweeping character as to worry for a time every electric railway in the state. As reported in the press, the decision is to the effect that no street railroad can use or cross the tracks of any other street railroad without having a franchise for the use of those tracks. Its bearing on the recently adopted rapid transit plans connecting New York and Brooklyn by means of the Brooklyn Bridge is of the utmost importance. It means, if strictly interpreted, that the one electric railway which has a legal right to cross the Brooklyn Bridge is the Brooklyn Heights Railroad Company. This of itself would defeat the broad plans adopted by the Brooklyn Bridge trustees, which were designed to consider the question as a whole, and not with regard to special privileges to be conferred upon any particular company. The idea was to give all the electric railroads in Brooklyn an equal chance, and if this decision is held to mean what it apparently means on its face, a monopoly of the bridge traffic will be created, which would defeat all the plans of the bridge trustees. It is reported that the presidents of the four leading electric railways in Brooklyn, the Brooklyn Rapid Transit Company, the Nassau Electric Railroad Company, the Brooklyn City & Newtown Railway and the Coney Island & Brooklyn Road, held a conference on the matter, and that an offensive and defensive alliance was made for the mutual benefit of the four roads. It is said that an agreement was entered into that no one of the roads would bring the matter up in the courts to the disadvantage of another, and that if the matter were brought to the courts the four roads named would combine to defeat any action based on the decision quoted above.

It follows, of course, that the street railway facilities of every city in the state would be seriously crippled if this decision holds. For instance, on Fulton street, in Brooklyn, several electric railway companies are obliged to use the same tracks. If they were forced to abandon these tracks the street railway facilities of the city would be seriously curtailed.

### Wall Street and the Electrical Stock Market.

The week in Wall street has been a record of substantial recoveries. Prices are on about the ante-election level, while securities are concentrated in stronger hands. Bonds are generally higher, the demand good and in some instances in excess of the supply. Trade reports are in the main favorable. They indicate that business has been helped by colder weather; that prices are generally firm, and the demand normal to the season. The weak spot in the situation is cotton and its manufactures. The raw material is not far from the lowest prices recorded.

I had a talk yesterday with an executive of one of the leading electrical manufacturing companies. He informed me that the affairs of his corporation are highly satisfactory, business good, the demand steadily increasing and prices fair. He says that net earnings will show a material increase over last year. This is about the tenor of reports from the electrical manufacturing field.

One of the many street railway and illuminating securities issues which are to be offered to the public during the ensuing 12 months, came out this week. The Akron Street Railway and Illuminating Company advertise $1,315,000 of five per cent 30-year consolidated gold bonds at 95 and interest. Samuel Thomas, of 80 Broadway, this city, is the president. The statement prepared by the Audit Company, of New York, shows that, for the year 1896, net earnings of the company were $112,140, the fixed charges on the entire bond issue $76,850, leaving a net surplus of $35,290.

Some idea of the prosperity of the large illuminating companies may be obtained from the statement of the Edison Electric, of New York. In October it made a gain in earnings of $13,922, and since January 1 the gain in the net has been $120,044.

The progress of the consolidation of the New York gas companies is of general interest to the electric light people, in view of competitive nature of the business. I understand that the deals will be brought to a head very shortly. This will place the business in the hands of two corporations which, while they will be under two separate managements, will in no wise be antagonistic. It is extremely doubtful if they will voluntarily make a lower price for gas, and their aggressive cultivation of the New York field will be more in the line of fuel gas than against electricity.

Mexican Telephone reports for September, net earnings of $4,687, a net increase of $406; for seven months net, $28,074; increase, $7,599.

In the market for electrical stocks there was very little feature beyond the movement up and down in sympathy with the general list. General Electric common recorded its highest price of the week Saturday, it being 34½. To-day's quotation reacted slightly. The preferred stock was bid 81 and held firm. Less than 100 shares were traded in in Boston during the week. Officers deny that the company has been buying in the preferred stock. In this connection it may be well to remember that a similar denial was made regarding the debenture bonds, and that the annual report issued subsequently showed that $2,000,000 of them had been purchased. Moderate activity was shown by Western Union within a narrow range. The week price was practically unchanged in the week.

American Bell telephone showed remarkable strength, advancing some 10 points in Boston, and at the close, Friday, was 264½ bid and 265 asked. This makes an advance of 60 points for the year, but is still 20 points below the high of last September. Erie Telephone sold up one point, closing at 70, and New England Telephone closed unchanged at 126. Electric Storage Battery stocks in Philadelphia were neglected. There was considerable activity in Pennsylvania Heat, Light and Power, although the quotations showed only a fractional advance in the week. It is said that the company is about to make a new departure in that it will pay particular attention to supplying for use in homes electric lights in connection with a storage battery service.

Commercial Cable is bid 170, with no offers. In view of the good earnings by Edison Electric Illuminating of New York, the price record is of interest. The last sale on the New York Stock Exchange was 121 on November 11. The price bid is 121, and the asked price 125. The Edison Illuminating Company of Brooklyn is bid 105 and held at 110. The last sale on the Stock Exchange was 106¼, September 30. BAIN.

Wall street, New York, Nov. 20.

### Hatch Storage Battery Company.

A dispatch from Boston says that the Hatch Storage Battery Company has purchased the factory owned by the Steel Edge Stamping and Retinning Company, at Millis, Mass., for $150,000. The plant covers 12 acres, and it will be utilized in the manufacture of storage batteries under the Hatch patents, dated June 29, 1897.

The Hatch Storage Battery Company was incorporated May, 1897, with $500,000 capital stock. At a meeting held October 25 the following directors were elected: J. B. Moors, G. W. Simpson, S. P. Hibbard, Joseph Middleby, Jr., Albert Edgcomb, James P. Clare and George E. Hatch (president).

The company, it is stated, has no debts and no bonds outstanding, and of the 50,000 shares of stock, has sold 16,000 shares at $10 a share. The Hatch battery, which is a promising one, was illustrated and described in the ELECTRICAL REVIEW for October 6, 1897.

The General Electric Company, during the months of June, July and August, received orders for 278 generators, aggregating nearly 14,000 kilowatts, for lighting purposes alone.

### The Heilmann Electric Locomotive.

*[From the Railroad Gazette.]*

Last Saturday a special dispatch reached New York saying that a trial of the Heilmann locomotive had been made on the Western Railroad of France, the day before; that a run was made from Paris to Nantes (269 miles) with a train weighing 200 tons (which must be the weight behind the tender, as the locomotive itself weighs about 123 tons); that a speed of 18 miles an hour was maintained; that the trial was especially to demonstrate the freedom from vibration of this machine; that everything was very satisfactory, and, finally, that "the directors have decided to adopt the Heilmann locomotives." We suppose that every reader of the *Railroad Gazette* who has any interest in this matter knows too much to accept for a moment the statement that the directors of the Western Railroad of France or any other great railroad will adopt the Heilmann locomotive unless it might be for some very peculiar service. The locomotive mentioned in this cable dispatch is doubtless the new Heilmann locomotive built within a year, and which is modified considerably from the "Fusée" (Rocket) of two or three years ago. It embodies, however, all the essential principles of the earlier Heilmann locomotive. This new engine was described, with illustrations, in the *Railroad Gazette*, of April 21, 1896. It is a central station and an electric locomotive combined. On 16 driving wheels (eight-coupled at either end) are carried an ordinary locomotive boiler with a Belpaire firebox, and an upright steam engine of from 1,300 to 1,400 horsepower with six cylinders, also two generators and an exciter, and, finally, an electric motor on each one of the eight axles. It goes without saying that such a machine can develop and can sustain great power and speed; but, on the other hand, it also goes without saying, that it is an extremely costly, cumbersome and unmechanical way of hauling trains over the face of the earth. This aspect of the subject we discussed at considerable length when the earlier Heilmann locomotive was attracting attention, namely, November 9, 1894, and that discussion was summed up in the following sentence: "Theoretically it is wrong; practically, it is too heavy and complicated." We see no reason for changing that opinion now.

### Selling Out Electrical Supplies.

Messrs. William H. McKinlock and W. C. Camp are acting as agents for the disposal of the stock of the Metropolitan Electric Company, 186–188 Fifth avenue, Chicago. The goods of this company are being sold at a particularly low price at the above address. In the stock are to be found quantities of rubber-covered wire, weatherproof and magnet wire, incandescent lamps, carbons, annunciators, bells and electrical supplies in general. This is undoubtedly an opportunity to secure electrical supplies at a very low figure.

### CHICAGO NEWS NOTES.

The American Electric Telephone Company reports the closing of several good-sized contracts for exchange equipments, and, to judge from the many places mentioned, it seems that American apparatus is fast becoming known in every corner of the states.

The Farr Telephone and Construction Supply Company, who some time ago issued a new edition of its splendid telephone catalogue and handbook, reports that the demand for its goods has largely increased, and is steadily increasing the more the catalogue becomes known. This is one of the good ways to advertise, besides carrying a card in the ELECTRICAL REVIEW.

Following the example of other progressive concerns, the Stromberg-Carlson company has had an attractive telephone sign made, suitable for all independent exchanges. It is handsomely gotten up, the words "Public Telephone Pay Station" appearing in white on a blue enamel background, the American shield with the word Independent diagonally across being to the left. The sign is 8 by 22½ inches, and should be in every independent exchange.

There seems to be no let-up in the way orders are being booked by the Western Telephone Construction Company. Among the more recent ones are Chester, Pa., 600 drops; Wilmington, Del., will soon be in operation with a capacity for 1,000 lines; Charlottesville, Va., orders a 350-number equipment; Hazlehurst, Miss., comes in with 100 numbers; Cambridge Springs, Pa., orders a like number, while Greenfield, Ohio, and Trenton, Mo., want a 200-drop outfit each. Paterson, N. J., closed for 300-line outfit. The apparatus for the Astoria Hotel in New York has all been shipped, and a finer equipment never left the company's shops, we are told.

As a rule the average business man fights shy of anything in the way of second-hand apparatus or machinery. The term "second-hand" seems to carry with it the idea of the article being old and useless. Very often this is true, and the station manager can not be too careful in investing in any so-called second-hand goods. Occasionally, however, it happens that a reliable concern finds it advantageous to take as part payment, or in exchange for larger units, generators, engines, etc., that are thoroughly serviceable in every way, and second-hand in name only. This is the case with the Chicago Edison Company, who announce the sale of a number of dynamos, engines, boilers and other apparatus, which would seem to be just what some stations are looking for. C. E. K.

Chicago, November 20.

The installation of the People's Light and Power Company, of Newark, N. J., will shortly be increased by eighteen 125-light Brush arc dynamos, having a total capacity of 2,250 2,000-candle-power arc lamps.

## THE BEST METHOD OF SETTLING DAMAGE CASES, AND THE PREVENTION OF ACCIDENTS BY THE USE OF FENDERS OR OTHERWISE.*

BY WILLARD J. HIELD.

It is hard to handle, in a short paper, this most difficult subject which is to-day perplexing the officials of all large street railway systems. However, as the study of these questions is made imperative by reason of their serious importance, I venture to offer a few ideas, which I trust may prove of some interest, if not of value. Like all other professions, the law has in late years given rise to many specialists, among whom the personal injury lawyer is most prominent to the street railway manager. His untiring efforts have wrought such a change that the question of settling damage cases to-day is vastly different from what it was a few years ago. The general manager or superintendent can no longer personally adjust the claims against his road, but must employ men for that particular purpose. It is now necessary for him to have a claim department, the system of which should be perfect in detail, and work in true harmony with his operating department, both for the prevention of accidents and the settling or fighting of damage cases.

The secret of success in handling damage cases lies, no doubt, in their being properly looked after from the start; *i. e.*, from the time they are first reported. How to do this varies as do the different cases, but no case should ever be handled by any one but an honest, careful and experienced claim agent. For such work men must be naturally qualified; they should ever have the interests of their road at heart, and yet not be blinded by too great a prejudice in its favor; they should have sound, shrewd judgment and be painstaking and careful of detail to the highest degree. Like the true physician, they should be of a happy, calm temperament, and also like him, should ever be ready to answer a call. The successful claim agent should have the faculty of handling all sorts of people without friction. His keen perception should reveal to him the nature of each case, but he should never betray anxiety for settlement. Every claim department should have a good system for securing reports of accidents, for obtaining evidence, and for keeping such files and records as may be necessary for its work.

The only accidents which demand serious consideration are those in which personal injury is involved. These may be divided into the three following classes:

1. Those in which there is an undisputed liability, and which, as a rule, should be settled as soon after their occurrence as possible.

2. Those in which there is a doubtful liability, and which, generally, should be settled after careful investigation.

3. Those in which there is clearly no liability, and which should therefore never be settled.

Frequently, cases may prove exceptions to these rules, but in handling them under such a classification, or any other, the following suggestions would seem to be of importance.

1. It is of great value in every case to acquire a knowledge of it as early in its history as possible. Procrastination is ever dangerous, and the claim agent should have for his motto, "Time is the essence of success."

2. Evidence should be carefully secured in every case soon after the accident. Too much can never be reported to the department, and what may seem of little importance at the time of the accident may prove most valuable in preparing the case for trial.

3. In nearly all unsettled cases (particularly in serious ones) an examination by one or more surgeons in behalf of the company is desirable.

4. Assistance and kindly tender of services, immediately after a serious accident, are more in place than advances for settlement.

5. Admission of the company's negligence is seldom necessary, but the true rights of the claimant should not be denied; as by antagonizing him all chances of settlement may be lost.

6. Whenever possible, a sworn statement should be secured from the claimant, giving his history of the accident and stating as nearly as possible the damage done. Such an affidavit, carefully and truthfully drawn and signed before witnesses, who should also attest it, may often prove most valuable either in settling or fighting a case. By it the claims of the interested party are clearly defined and limited, so that any subsequent intention to change them may be checked.

7. In every case the claim agent should be fair, but firm. Too cheap a settlement is not the best settlement, but one too expensive is quite as bad, and perhaps worse. However, the claim agent can generally keep the claimant good natured and insist upon his acknowledging that the settlement is a fair one at the time it is made, and thus prevent his feeling or talking ugly about it later.

8. A full release of all claims should be taken from the claimant, and its contents explained to him fully. This is of great importance, as the validity of releases is often disputed, and it is then quite necessary to show that they were properly taken. On this account, it is best to explain the release to the claimant before witnesses (who should also attest it), or to make him acknowledge later before them that he executed it of his own free will, understanding its nature.

From these suggestions one may deduce that the method best adapted for the handling and settling of damage cases is to be prompt, thorough and careful, with a liberal use of sound, common sense. Whether a case should be speedily settled, or not settled at all, is a matter which must be decided from the peculiar circumstances which it presents, and not by any fixed rule. As a general thing, however, it is well to settle all cases where the injured parties are inclined to be fair, according to the merit each case contains, and fight all cases in which the claimants are very unreasonable, or where fraud is apparent. This rule carried out with the right spirit will prove a valuable policy for any road. If a case be settled, let it be done with due consideration of justice, and if it be fought, let every effort be made to fight it in the fairest and most efficient way possible.

It is not usually desirable that the claim agent should make offers of settlement, but rather it is advisable for him to draw his man out and get him to state definitely, if possible, what sum he really thinks he should be paid. Generally, such a sum can be considerably cut down, no matter what the case; but if it is not an unfair amount, in consideration of the injury, it should be paid. Seldom pay more to a lawyer than to the injured party himself, and do not settle a case simply because suit is threatened or commenced. Never settle out from under an attorney who has been professional and courteous in his relations to the road; yet, when an unprincipled damage lawyer is interested in a case, do not hesitate to disregard him in settling it. When a good one to fight, the case should not be settled simply because it will cost less. It is ever well to remember both that victories in court are a great benefit and that defeats are a great loss.

While, as a strict matter of law, it may not be correct, yet it is always well to give some consideration, when settling a case, to the circumstances of the injured party and allowing such personal interest to enter into the transaction as will not be inconsistent with good business. As a general thing the claim agent should listen with apparent indifference to the claims of such persons as Jewish peddlers, loud-talking and bulldozing men, sharp-tongued women and all others whose claims have either the appearance of fraud or unreasonableness; with apparent interest and sympathy to those other few cases which seem to merit it.

The gist of the foregoing may be expressed in these few words: Have good claim agents of sound judgment, who will not settle cases by arbitrary rules, but who will rather consider them each in its peculiar details, weighing well the seriousness of the injury, the manner of the accident, and hence the liability involved, as well as the circumstances of the claimant.

The old saying that "An ounce of prevention is worth a pound of cure" was never better applied than to the accident features of a modern street railway system. The rapid transit now in vogue upon the busy thoroughfares of our cities, whether by means of the trolley or the cable, has greatly increased the number of street railway accidents, and hence has caused the question "How to avoid them?" to be of very serious interest.

For this purpose the following points seem to be of particular interest.

1. It is very important for the prevention of accidents, as before stated, that the operating and claim departments work in perfect harmony and unison with each other to this end.

2. The employing of none but good men is most essential, and having employed good men it is quite important to keep them good in the fullest sense of the term.

3. Carefully drawn, explicit rules for operating cars made with due regard to the various local conditions should be rigidly enforced and intelligently observed.

4. Speed on various lines should be regulated according to the chances of accident presented.

5. Every car should be equipped with the best controlling apparatus, gong and headlight, and also be provided with such devices for the prevention of accidents as may seem practical.

By this last statement several good devices for the prevention of accidents are rather indefinitely referred to, among which the fender and the safety gate should be placed at the head. Experience has shown that the fender is seldom a nuisance and is frequently of great value. A simple type will be found to be very practical, which, while it does not insure against injury, yet very often prevents serious results. The dropping or lowering of the fender is seldom of any benefit, as motormen are generally too much occupied in stopping their cars when a collision is imminent to pay attention to the fender. In many cases where the speed of cars has been reduced from a fast to a slow rate, the fender will pick up, with no harm resulting, persons who without it would surely go under the car. Where the collision occurs while the car is under great speed, serious injury is not unlikely, but even in these cases loss of life and limb may frequently be prevented and money saved in the long run.

The safety gate with which all motor cars in Minneapolis and St. Paul are equipped and which was not generally approved upon its introduction but a few seasons ago, has demonstrated its great value and practicability by almost annihilating those accidents which occur through boarding or alighting from cars. The danger of these accidents increases with the number of passengers carried and on nearly every road they cause a large part of the injury and damage expense. They present to the fakir the best opportunity for making a case, and always give the jury a good chance to give the plaintiff the benefit of a doubt. The safety gate is practical for any city. In fact, we have seen its best use when our road was earning over three times its ordinary receipts. With it the conductor has but one part of his car to watch while giving the starting bell, and in case there is reason for passing persons at crossings, there is no danger from their trying to board the moving car. It also affords protection to people standing on the rear platform in case of a car rounding a curve at high speed, or on other occasions, when a passenger, through his own condition or carelessness, or the operation of the car, is liable to fall off.

As the gate is operated by the motorman it should never be opened until the car is at a standstill, and should always be closed just before the power is applied for starting. After the public becomes accustomed to the safety gate its operation demands no change of running time from that used before its introduction. The most timid, whether old or young, will walk without fear to the gate while the car is stopping and thus take but little time to alight. The gate is also of great service in handling large crowds at the parks where people seem to lose their common sense, as well as all ideas of propriety, and try to board and hang on to cars regardless of the danger involved. In such instances the value of but one entrance to the car is quite obvious, as at any moment the crowd may be checked by the closing of the gate and the car started.

Screens for the side of cars (when the trolley posts are between the trucks), sand-boxes always filled with sand, and many other devices are also of considerable importance, and tend, each in its way, to reduce the number of accidents to the minimum. It is not possible, however, to operate cars entirely without accidents, and, in studying the problem, we should not look for perfect results.

The above presents roughly a few ideas suggested by long experience after trying nearly all the remedies known, and gives one the firm opinion that it is essential, so far as possible, to have the best equipment, including practical safety devices, and the best men obtainable for operating the cars and for the claim and other departments, governed and aided by the best rules and supported by the best policy.

*Read before the American Street Railway Association, Niagara Falls, N. Y., October 22, 1897.

### Willyoung's New X-Ray Apparatus.

Willyoung & Company, of Philadelphia, are, as is well known, pioneers in the X-ray field, being the originators of a number of features of construction now very generally used, among these being the adjustable condenser and the "Ideal" vibrator. In their "1898" types of apparatus, several illustrations of which are herewith reproduced, it is stated that their high reputation has been fully sustained. In all of these new types, the vibrator used is an independent one of the Willyoung type. The current in the coil proper may thus be varied through any range without in any way affecting the character of the break. To change the rate of break, requires merely the adjustment of a small bob.

In addition to the usual spark gap in parallel with the tube, all the 1898 type Willyoung apparatus is equipped with a "series" gap as well. This latter gap is in series or "tandem" with the tube, and not only gives a fine regulation of the amount of energy expended in the tube, but also serves to damp out the discharge at make, which, if allowed to take place, would blacken and eventually destroy the tube. The makers state that, so far as they know, the Willyoung apparatus is the only kind containing this improvement. Both these spark gaps are adjustable by use of milled heads conveniently located.

For the protection of the apparatus each one is equipped with an improved form of interlocking switch; this switch controls two circuits, that of the vibrator (or break) and that of the coil, in such a way that the coil circuit can only be closed after the vibrator circuit is closed and must always be opened before. In this way, the coil can never be short circuited or burned out. A safety fuse avoids similar danger of "burn out" from excess of current. In operating the interlocking switch, pulling the handle forward closes the vibrator circuit. It can then be moved to right or left so as to close the coil circuit in the one direction or the other. To open the circuit, these operations must be reversed.

The Willyoung apparatus is made for either battery or 110-volt circuits. It is also made in a variety of styles, according as it is to be used in office, outdoor, or hospital practice. For hospital work, the apparatus shown in Fig. 3 is especially designed. In this form the coil proper is concealed permanently within the cabinet, nothing appearing on top except the various manipulative devices—spark points, condenser switch, vibrator, fuse, etc. All of these parts are handsomely finished and present a rich appearance in contrast with the cabinet, which is of polished cherry. When not in use a beveled plate-glass top incloses these parts. At the left is a swinging leaf, while the tube stand is attached directly to the cabinet, having universal motion by means of a special clamp. A cupboard below gives ample room for a fluoroscope and odds and ends, while two drawers give space for tubes.

FIG. 1.—NEW WILLYOUNG X-RAY MACHINE, TO BE OPERATED BY 110-VOLT DIRECT-CURRENT CIRCUIT.

When battery power is used the battery is placed in a space to the rear of the cupboard. The whole cabinet is mounted upon three-inch castors with heavy rubber tires, and may thus be quickly and noiselessly pushed about from room to room, or through a hospital ward right up to the bedside of a patient. James G. Biddle, 910 Drexel Building, Philadelphia, who is sole selling agent for Willyoung apparatus, will be glad to send a new booklet treating of new X-ray devices to any one making the request.

FIG. 2.—NEW WILLYOUNG X-RAY MACHINE, WITH STORAGE BATTERY MOUNTED ON SPECIAL WARD CARRIAGE.

FIG. 3.—NEW WILLYOUNG X-RAY CABINET MACHINE, TO BE OPERATED BY STORAGE BATTERY OR 110-VOLT DIRECT-CURRENT CIRCUIT.

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The following are the earnings of the Metropolitan Street Railway, of Kansas City, Mo., including what is termed the Metropolitan system and the Kansas City elevated railway system:

| | 1897. | 1896. | Increase. |
|---|---|---|---|
| Oct., Gross..... | $193,387 | $170,764 | $22,623 |
| Net..... | 100,075 | 78,044 | 22,030 |
| Sur. after charges... | 55,010 | ..... | ..... |
| Five months' gross.. | 858,529 | 805,199 | 53,358 |
| Net..... | 401,312 | 358,272 | 43,040 |
| Sur. after charges... | 175,966 | ..... | ..... |

### A Legal Definition of Electricity.

*[From the London Electrical Engineer.]*

In view of the connection between English and Continental electrical engineering, it will be useful to know what rights and restrictions appertain to electricity. A jurist, writing in a Swiss paper, opens up the question of the legal definition of electricity, and as to what extent it can be treated as property. Gas, for instance, is a property, because it can be put in receptacles, and even turned into fluid; but electricity is difficult to store, and, when stored, only develops chemical energy. If one refers to a recent extraordinary decision of the Imperial Courts of Germany, then no magistrate can ever commit any one who, without being entitled, took electricity to a point called C from a wire connecting A and B; but, as the axiom holds good—*nulla pœna sine lege*—the nearest catagory under which it may be classed would be fraud. Referring to the civil code, the question is asked, "What is the delivery of current?" Customer D gets current direct from the central station, and gives it to E. Is that, on the part of D, a lease or a purchase? It must be a purchase, because the power is not only used, but consumed; that is to say, it can not be used over again. A point which is especially advocated in legal circles as being a matter that should be brought before the legislature is that rights of expropriation over power-current conduits or over private electrical apparatuses should be recognized as soon as a perceptible increase in the national wealth is evident as the result of the establishment of those works. That is only just, because at present there are such stringent regulations as to security against accidents, and under the existing law, the government can disturb any of these works for the "public good" without giving any compensation. A man who is enterprising enough to start these works under such conditions is at least entitled to rights of expropriation.

## MUNICIPAL OWNERSHIP AND OPERATION OF STREET RAILWAYS.*

BY P. F. SULLIVAN.

(Concluded from page 244.)

"I can not here attempt to describe at any length the rise and rule of the despotic oligarchy which for 20 years dominated political life in this city and state, ground down our people, endeavored to crush out independence, cheated us of our suffrage and ate up our substance.

"CHARLES MORRIS HOWARD,
"Baltimore."

"Our municipal condition, however, is far from satisfactory. Our administration is neither judicious nor economical. Questions of appropriation do not receive mature deliberation; results in nearly all departments are not the best of their kind, and the disposition of the council has been, and now is, to exceed annually the current revenues of the city.

"VIRGINIUS NEWTON,
"Richmond, Va."

"The interests of the people must be conducted by those who are intrusted to manage them with the same wise, careful and conservative judgment that a competent business man should use in the transaction of his own affairs.

"A. V. S. LINDSLEY,
"Nashville, Tenn."

"The abuses of administration were intrenched by law; the heads of departments had just been re-elected for four years, the ring organization was perfect in every detail; its members were held together by the cohesive force of public plunder, and its managers had ample sources on which to draw for all the money which might be needed for any purpose, and had the influence which flows from the absolute power to distribute the public patronage, franchises and improvements; and it was supported by thousands of voters who were dependent on city work and knew that active, willing and efficient service was the price they must pay for the opportunities to earn a living for themselves and family.

"GEORGE W. GUTHRIE,
"Pittsburgh."

"The development of an active, intelligent, civic spirit, the practical exclusion of the most ignorant and purchasable classes from the lists of voters, and the absence of political influences in the matter of appointments, in foreign cities, are in brilliant contrast with our deficiencies in these respects.

"CHARLES RICHARDSON,
"Philadelphia."

Under the conditions disclosed by the foregoing extracts—extracts, too, from American citizens, is it not strange that men will be found who will advocate enlarging the opportunities and powers of our city governments? Surely no business man would advocate it. On the contrary, he would have our municipalities conduct the business in hand in the same manner as the same business could be conducted by private enterprise before he would approve enlarging their powers and opportunities.

But the theorist says, enlarge the responsibilities of the government, and you will improve it. Acting upon that theory the doors of every house of correction and penitentiary in the land should be opened and every evil doer therein sent back to the community whence he came. He should then be restored to his former position in the community, and instead of looking after his conduct and affairs more closely, he should be given carte blanche to do as he may wish.

*Read before the American Street Railway Association, Niagara Falls, N. Y., October 22, 1897.

### OWNERSHIP AND OPERATION ABROAD.

According to the returns of street and road tramways to Parliament, July, 1896, there were 153 distinct street railway undertakings in Great Britain and Ireland, subdivided as follows:

| | |
|---|---|
| Number of companies owned and operated by private capital.... | 116 |
| Number of undertakings where tracks are constructed by the municipalities and leased to private parties..... | 31 |
| Number of undertakings owned and operated by the municipalities..... | 6 |
| Total ..... | 153 |

The six cities where the properties are owned and operated by the municipality are as follows:

| | Population. | Miles of Track |
|---|---|---|
| Glasgow and suburbs. | 840,000 | 73 |
| Leeds..... | 400,000 | 27 |
| Sheffield..... | 380,000 | 19 |
| Huddersfield..... | 100,000 | 21 |
| Plymouth..... | 90,000 | 5 |
| Blackpool..... | 35,000 | 5 |
| | | 150 |

### GLASGOW.

Of the above cities Glasgow is the only one wherein the undertaking may fairly be called successful. And, with reasonable economy, it could not well be otherwise than financially successful. For a population of over 800,000, Glasgow has only 73 miles of track, whereas St. Louis, with a population of less than 700,000, has over 335 miles of track. It does not follow, therefore, that, if the government of St. Louis was conducted equally as well as the government of Glasgow, it could also operate the street railway system of that city successfully financially.

It is well to remember, however, that Glasgow boasts of a "continuity of existence of over nine centuries." We may therefore safely place it within the limits of possibility that, when our American cities survive a "continuity of over nine centuries," they may be so far advanced in methods and morals that they, too, may be intrusted with additional power and responsibilities.

### LEEDS.

The city of Leeds had operated its street-car system for nearly three years. The first year showed net earnings of approximately $15,000, less than one per cent upon the capital invested, whereas private capital earned and paid seven per cent the previous year. The second year showed net profit of $35,000, not quite the interest upon the sinking fund. And such results, too, with a population of nearly 15,000 per mile of track.

### SHEFFIELD.

Previous to the acquisition of the street railway by the municipality, July, 1896, private capital received from five per cent to eight per cent dividends from the operation of the property. Under municipal management there was a loss the first year, the property not even earning the interest upon the capital invested. And such results in a city which has over 17,000 persons per mile of track.

### HUDDERSFIELD.

This was the first city in England to attempt the operation of its street railway, and for the 14 years which it has operated the property there has been a loss of $311,000, varying from $3,300 to $83,000 in a single year.

This loss has been met by drawing $105,000 from depreciation account and the balance by taxation, varying from one-ninth of a penny to five pence per pound. It may seem strange that the municipality should thus continue to operate under such conditions. The fact is that Huddersfield is a manufacturing city, and the non-property and small tax paying voters are in a majority.

### PLYMOUTH.

In the last fiscal year there was a loss of $5,430. This city did not acquire the property voluntarily. On the contrary, the operating company intentionally forfeited its charter and abandoned the operation of cars.

### BLACKPOOL.

This operation shows a net profit for four years of $992 after paying interest and charging off to depreciation.

And yet in Plymouth, Huddersfield, Sheffield and other cities in England, boys of from 14 to 16 years of age, receiving $2.50 per week, are employed as conductors. Notwithstanding such conditions, some of those cities have not earned the interest upon the capital invested. Does any one suppose that American cities, if operating street railways, could employ such conductors at such rate of wages? In Germany there are only three cities which own and operate their street railway systems, and two which own the tracks and lease them to operating companies. In France, none.

The facts as they are before us are that there are few cities abroad which own and operate their street railway systems with more or less indifferent results, and only one of which, viz., Glasgow, which can properly be called a financial success; and yet there are those who would have American cities, regardless of the differences of conditions and institutions, plunge blindly into the acquisition and operation of 15,000 miles of street railway tracks because Glasgow operates 73 miles successfully.

It seems to me that those who honestly advocate the acquisition and operation of street railways by municipalities do not look below the surface. They find that an occasional city abroad does such things and they immediately jump to the conclusion that we should do likewise. They do not study the conditions with respect to accommodations furnished abroad as compared with those in this country; the methods of administration there compared with these here, and the civil service abroad compared with ours.

### DIFFERENCE IN CONDITION.

In a previous paragraph I showed the difference between St. Louis and Glasgow. Below will be found a comparison of other cities of nearly the same population, taken from the *Yale Review* for May, 1897:

| | Population. | Area in Square Miles. | Street Railway Mileage. | Mileage per 1,000 of Population. | Mileage per Square Mile of Area. |
|---|---|---|---|---|---|
| Birmingham... | 497,000 | 20 | 33 | .066 | 1.65 |
| Boston..... | 494,000 | 37 | 295 | .597 | 8.00 |
| Edinburgh..... | 289,000 | 14 | 21 | .072 | 1.50 |
| Detroit ..... | 300,000 | 28 | 202 | .673 | 7.21 |
| Leeds..... | 400,000 | 34 | 27 | .067 | 0.79 |
| Cleveland..... | 350,000 | 32 | 205 | .585 | 6.40 |
| Liverpool..... | 641 000 | 21 | 66 | .103 | 3.14 |
| St. Louis..... | 644,000 | 62 | 216 | .330 | 3.50 |
| Manchester... | 530,000 | 20 | 54 | .102 | 2.70 |
| Baltimore..... | 512,000 | 34 | 262 | .511 | 7.70 |
| Bradford ..... | 238,000 | 17 | 23 | .091 | 1.28 |
| New Orleans... | 250 000 | 40 | 169 | .676 | 4.22 |
| London ..... | 4,400,000 | 105 | 230 | .052 | 2.19 |
| New York..... | 1,851,000 | 59 | 357 | .200 | 6.05 |

Compare any one of the above foreign cities with an American city of the same population, and you will find that the area of the latter is greater, and the street railway accommodations greater, in proportion than the former. The English cities average over 15,000 persons, and the American cities over 2,600, per mile of track. And yet there are those who would state that, because Leeds could operate 27 miles of track successfully, Cleveland, with nearly the same population and area, could also operate 205 miles of track—nearly nine times as many miles of track—also successfully. If, therefore, the methods of civil service and administration were the same in both cities, Leeds could be eminently successful and Cleveland a monumental failure.

### COMPARISON OF ADMINISTRATION.

(City Government in the United States, by Alfred R. Conkling.)

"The Right Honorable Joseph Chamberlin, in an article on "Municipal Institutions in America and England," in *The Forum* for November, 1892, makes an interesting comparison between Birmingham (his residence) and Boston. He says the total annual municipal expenditure (excepting the appropriation for schools and almshouses) of Birmingham is but $1,665,000; while that of Boston is $10,194,000, or more than six times greater than the expenditures of Birmingham. The two cities have much in common. They have about the same population, and are both large manufacturing towns."

"The public works of American cities are, perhaps, the field of more swindling than any other department of the municipality. Brooklyn furnished us with an object lesson. For example, the Commissioner of City Works found nearly 50 sinecures in his department, and he has begun by abolishing these offices, at a saving of $50,000 a year to the city. The result is that he has that additional sum to expend upon actual work for the welfare of the public. Fifty other idlers in his department are marked for early discharge, and the Commissioner of Public Parks has also dismissed 75 men, whose only occupation was drawing a salary."

"The comparative cost of municipal government in Europe and America is easy to understand. Any person who inspects the annual budget of the chief cities of the Old and the New World will be startled at the economy of the one and the extravagance of the other."

Financial statement of representative cities:

| | Population. | Fiscal Year | Net Indebtedness | Capita Indebtedness | Annual Interest Payment | Annual Expenditure | Cost of Education per Capita | Annual Expenditure per Capita |
|---|---|---|---|---|---|---|---|---|
| London.... | 4,231,452 | '90-91 | $225,000,000 | $53 29 | $10,000,875 | $54,601,965 | 1.86 | $12 93 |
| Glasgow... | 784,792 | '93-94 | 39,630,770 | 50 61 | 1,547,890 | 9,046,000 | 1.62 | 11 54 |
| Birming'm. | 478,000 | '92-93 | 38,146,440 | 88 78 | 1,330,185 | 7,330,025 | 1.45 | 16 36 |
| Berlin.... | 1,579,244 | '92-93 | 66,375,000 | 42 03 | 2,490,000 | 28,915,240 | 2.16 | 18 31 |
| New York.. | 1,515,301 | '94 | 101,426,461 | 66 93 | 4,866,888 | 37,382,065 | 3.04 | 24 65 |
| Chicago ... | 1,438,010 | '94 | 17,122,500 | 11 90 | 691,421 | 32,090,154 | 4.91 | 22 31 |
| Boston.... | 494,205 | '95 | 37,181,428 | 75 18 | 2,483,716 | 22,099,548 | 5.09 | 44 71 |

The average per capita expenditure of the foreign cities above mentioned was $14.79; of the American cities, $30.84.

"The new Mayor of Chicago (1894) has said that the greatest danger of cities is that of being robbed by their own officials, in the sense of being burdened with expensive and superfluous office-holders. In one month he directed the City Treasurer to reduce his salary 10 per cent and transfer it to the general fund."

"A law was passed in 1883 to build a new aqueduct from the Croton River watershed to the city of New York. This stupendous public work became a harvest for politicians; large sums of money have been squandered upon it, and much of the work had to be done over. The defective work was in part owing to corrupt inspectors and engineers, who approved work that was not only contrary to specifications, but done in a most scandalous manner.

"The public works of American cities are, perhaps, the field of more swindling than any other department of the municipality. Mr. White, in his suggestive article in the *Forum* for December, 1890, says: 'The city halls are the acknowledged centers of the vilest corruption.' In that connection this remark applied chiefly to the aldermen, and occasionally to the Mayor. But the public works that are controlled by the officials in the city halls of the larger towns are generally as badly and corruptly done as the proceedings of the city legislature. I could give many examples, but I shall simply remind the reader of the 'Tweed' court-house in the city of New York, which cost untold millions, and the new city hall of Philadelphia. The visitor to the Quaker City is at once struck with the prominence of this building. The gigantic tower is a monument to the extravagance and corruption that formerly existed in the city government.

"Unfortunately, the inspectors of public works in large cities are often political appointees 'out of a job.' They must be taken care of by the ring, and are put upon the pay-rolls to the detriment of the citizens. Their salaries are so low, and their 'assessments' or contributions to the ring so large, that they are often forced to approve of defective public work, or blackmail the contractors of private dwellings in order to support themselves and their families. These inspectors learn from their superiors lessons in the practice of blackmail. Their political employer or overseer has probably extorted money from the contractors on public and private buildings, so that he is not surprised when his clerks and underlings in turn pursue the same practice. These inspectors show discretion in levying tribute on citizens.

(*To be continued.*)

## Electric Power Utilization in California.

Since the completion of the great three-phase electric power transmissions on the Pacific coast between Folsom and Sacramento and the San Joaquin and Fresno, the use of electricity as a motive power has made great strides. Two of the most important flour mills are now added to the already long list of consumers.

The first to place its dependence on electric motors instead of the steam engine was the Sperry Flour Mill, of Fresno. This is driven by a General Electric synchronous motor of 150 kilowatts capacity, running at 600 revolutions. The illustration shows this motor with a small bipolar motor to bring it up to speed, in the basement of the mill, whence the main belt passes to the rolling and grinding machinery above.

The second mill is the second in importance on the Pacific coast and the largest flour mill in the United States using electricity instead of steam. Its electrical equipment consists of three General Electric 3-phase, alternating-current induction motors operating at a pressure of 500 volts. The largest of the three motors has a capacity of 75 horse-power. This is belted to the main shaft of the mill and drives all the flour-making machinery. It runs continuously for 24 hours, and for three months without stop. The second largest motor is one of 30 horse-power. This occupies a position on the second floor of the mill and drives all the cleaning machinery. It runs continuously for 18 hours daily. The third is a 20-horse-power motor, and is placed in the basement near the 75-horse-power motor. This drives the roll for grinding the corn and the barley. Its work is intermittent, and it runs from eight to 10 hours per day only.

The power consumed by the motors is registered by means of recording meters, which show the total horse-power of current consumed. These meters register exactly the power used, and allow the company to keep a careful watch upon their machinery, and obtain the highest economy in operation. For instance, when the cleaning for the day is completed and the 30-horse-power motor and all the cleaning machinery are shut down, all expenses for power in that department cease at once. No power is wasted in running idle shafting and belting. The same is true in a still greater degree in the corn and barley crushing department, where the work is more intermittent.

Still another source of saving lies in the fact that neither engineer or fireman is required to operate the mill electrically. The motors are so simple in their operation that any employé about the mill can handle them. To start the motor a simple switch is closed and a lever on the motor thrown over. In less than a minute the motor begins to perform its full load of work, and continues without further attention from the operator. The stoppage of the motor is an equally simple process. No attention is required beyond this, except that entailed in keeping the motor lubricated. Power is always ready at call, but the mill is not put to one penny of expense for power after the machinery ceases to operate. In addition to this economy, the wear and tear on bolts, bearings and machinery is reduced to a minimum by the system of subdivision of power which has been adopted. The cost of hauling coal from the river to the mill, which is in the center of the city, is also saved. It is estimated that the economy in actual power consumed in the Phœnix mill by the present method of driving is not less than 15 per cent, and the total saving in the entire cost of operation will pay for the electric motors, their installation and adaptation in less than one year.

In addition to the economy in the operation of the mill by the introduction of electricity as the motive power, a considerable amount of space has also been saved, as will readily be realized, and the room formerly occupied by the driving machinery can now be utilized for other machinery or for storage purposes. The present capacity of the Phœnix mill is 275 barrels of flour and 20 tons of rolled barley and feed every 24 hours, and the entire output of this mill is taken by local consumption, none of the product being shipped outside the state. It was due to the careful investigation of the subject by Mr. J. H. Arnold, the manager, that electricity was adopted as a motive power. He is already reaping his reward for himself and his company in benefits constantly accruing.

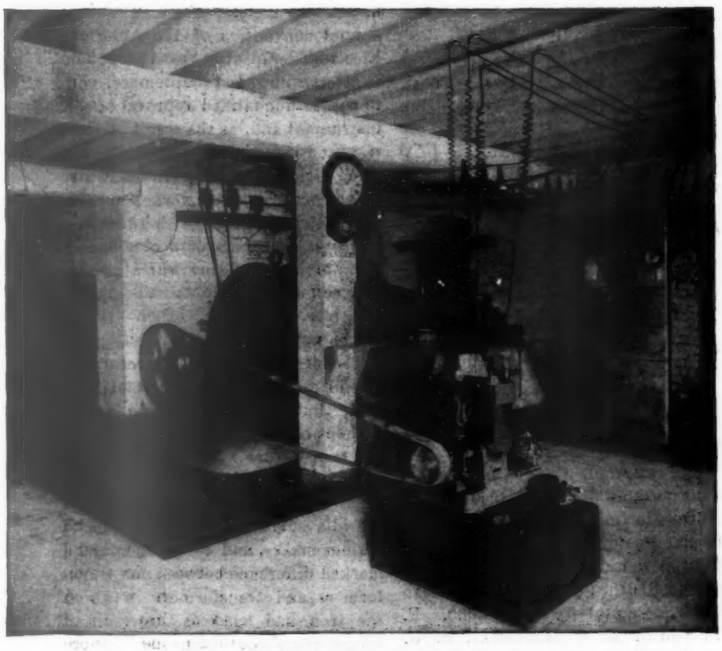

Fig. 1.—150 K.-W. G. E. Synchronous Motor in Sperry Flour Mill.

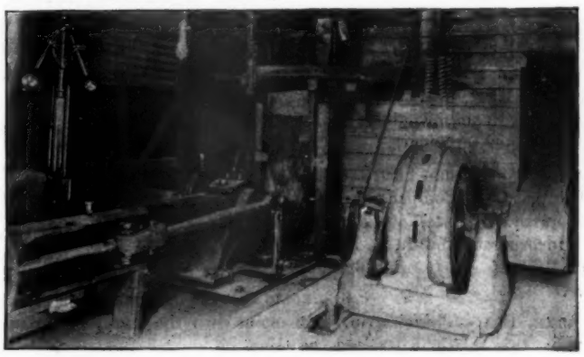

Fig. 2.—75 H.-P. G. E. Induction Motor, Driving Flour-Making Machinery in Phœnix Flour Mill.

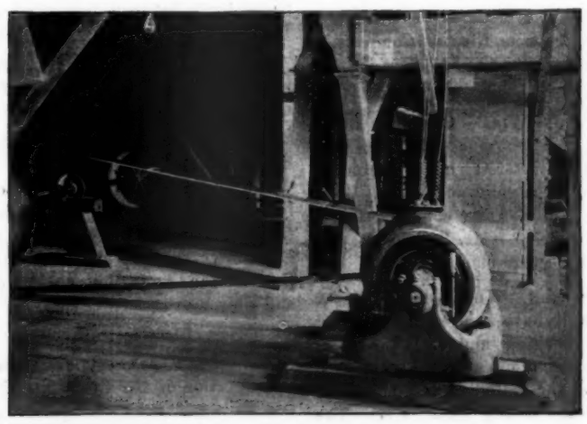

Fig. 3.—30 H.-P. G. E. Induction Motor, Driving all the Cleaning Machinery, Phœnix Flour Mill.

## Cooling the Anode of X-Ray Tubes.

To the Editor of Electrical Review:

When a strong current is sent through an X-ray tube the glass is darkened and the tube breaks down from heating the anode. To avoid this I use a hollow platinum anode cooled by a stream of air, water or oil. If this type of tube has sufficient interest, I shall be glad to describe it in detail and publish figures. Meantime I mention for the benefit of experimentalists that the glass work of my tubes has been done by Kirmeyer & Oelling, 17 Bromfield street, Boston. To distinguish this type of tube from others, I have called it the A-W-L tube. William Rollins.

Boston, November 19.

## ADVANCE INFORMATION

### Electric Light and Power.

MERRILL, MICH.—A project is on foot to establish an electric light plant at this place.

KAUFMAN, TEX.—A franchise has been granted to the Kaufman Electric Light and Power Company for a term of 50 years. Work on the new plant will begin immediately, and is to be completed in 90 days.

CHARLESTON, MO.—The Charleston Electric Light Company has been incorporated. Capital stock, $20,000. Incorporated by J. H. Moore, J. P. Bridges, E. G. Rolling and others.

STARKE, FLA.—The electric light plant at this place will soon be completed.

RISING SUN, IND.—Wm. Clore's Sons are negotiating for the purchase of a small electric light plant for lighting their shops.

MANISTIQUE, MICH.—An electric light plant will be established.

HEARNE, TEX.—The electric light plant was put into operation recently.

TERRELL, TEX.—A. Joy has been granted a 50-year charter for an electric light plant.

FORT MEYERS, FLA. — A $6,000 electric light plant is to be established in new hotel at this place.

CHARLESTON, MO—The Charleston Electric Light Company has been incorporated by J. H. Moore, J. P. Bridges, E. G. Rolling and others. Capital stock, $20,000.

MADISON, GA.—Mr. Thomas may be addressed concerning contemplated construction of electric light plant.

ELKIN, N. C.—The Elkin Electric Light Company has franchise for lighting plant, and has let contract for its erection.

BROWNSVILLE, TEX.—J. T. Smith, has been awarded contract for the erection of an electric light plant.

MADISON, S. D.—An electric light plant has been established.

BESSEMER, ALA.—E. E. Vining, of the Bessemer Electric Company, is making some improvement in his plant and system.

HUDSON, WIS. — Christian Burkhardt has purchased James A. Andrew's interest in the Hudson electric light plant and Willow River water power. The consideration is about $30,000. Mr. Burkhardt now owns the entire plant.

APPLETON, WIS. — Langstadt & Crosswell have secured the contract for furnishing and installment of an electrical plant in the large sawmills of the Wall-Spaulding Lumber Company, at Big Falls, Wis. The equipment will include an engine, a 150-light Edison incandescent dynamo and the wiring of the plant and placing 125 incandescent lights. The work on the contract will commence within a few days and it is expected that the plant will be in operation by December 1.

### New Telephone and Telegraph Companies.

ST. LOUIS, MO.—The Missouri Automatic Telephone Company has been incorporated by Charles T. Farrar, William Dean, Henry A. Colt and others. Capital stock, $100,000.

SHEBOYGAN, MICH.—The Michigan Telephone Company has filed its $750,000 blanket mortgage.

MADISON, WIS. — The Monroe County Telephone Company has been incorporated by V. V. Willis, E. V. Benjamin and H. C. Hackner. Capital stock, $8,000.

LEWISTON, MONT. — A telephone line is to be built from Grass Range to Gilt Edge, connecting at the latter point with the Rocky Mountain Bell line.

BATES, MICH.—Manager Barry is establishing a telephone station at this place.

BEDFORD, IND.—A long distance telephone between Indianapolis and French Lick Springs has been completed. The line runs through this city notwithstanding an injunction.

TELFORD, PA.—The Delaware & Atlantic Telephone Company have made a survey looking towards the erection of a telephone line from this place to Pennsburg. The line, if erected, will be about 15 miles long.

WILMINGTON, DEL.—The Delamarvia Telephone Company is erecting wires and cables, and expects to have its system in operation by January 1.

DUNN, N. C.—The Dunn & Lillington Telephone Company has been incorporated; capital, $5,000; principal office at this place; incorporators, G. K. Grantham, D. H. McLean and others.

HOLLY, MICH.—The State Telephone Company is extending its line from Pontiac through Clarkston, Holly and Fenton to Durand and Owosso. The poles have arrived and work will be commenced in a few days.

AFTON, N. Y.—A telephone line is being built between this place and Deposit.

BATAVIA, N. Y.—The Bell Telephone Company has completed its new line from this place to Albion, but it has not yet been opened to the public.

NACOGDOCHES, TEX.—A telephone line has been completed to this point from Jacksonville via Rusk, Alto and Douglass. It connects here with a line to San Augustine via Melrose and Chireno.

### New Electric Railways.

WAUKEGAN, ILL.—The Highland Park portion of the Bluff City Electric Railway is nearly completed and will probably be put in operation before December 1. It is nearly four miles long, running from the southern limits of Highland Park through Highwood to the Fort Sheridan railway station.

NASSAU, N. Y.—The sub-contract for the construction of the electric railroad between this place and Brainard has been let to Contractor Welch, who also has the contract for building the road between East Greenbush and Nassau.

HAMILTON, OHIO—A company composed of prominent business men and farmers is being organized for the purpose of uniting the surrounding towns with Urbana by means of an electric line. The scheme is to build a line to Piqua via Westville, St. Paris, Lena, Fletcher, Conover; a branch to London via Mutual and Mechanicsburg, and another branch to touch West Liberty, Degraff and Quincy. At Piqua the line will connect with the Miami Valley line to Troy, Dayton, Franklin, Middletown and Cincinnati.

SYRACUSE, N. Y.—An electric road will probably be built from this place to Moravia, a distance of 41 miles. A survey of the road has been made and a company organized with $1,000,000 capital.

ONEONTA, N. Y. — An electric line is to be built here.

MARIETTA, OHIO—The right of way for the electric road from Williamstown to Parkersburg is being secured.

ALBANY, N. Y.—The Mechanicsvill & Stillwater Railway Company has petitioned the trustees of Waterford for a franchise to build an electric railway in that village.

### New Incorporations.

MINNEAPOLIS, MINN.—The Monitor Electric Company has been incorporated. The capital stock is $100,000 and the incorporators are A. D. Arundel, S. N. Smith, T. B. Hatch and T. C. Shove.

SACRAMENTO, CAL. — Articles of incorporation have been filed by the El Dorado Light and Power Company, to manufacture and produce electric light, power and heat from the waters of the South Fork of the American River. Capital stock, $300,000. F. F. Smith, W. C. Hendricks, R. C. McCreary, T. A. W. Shock and J. G. Cunningham, of Sacramento, are named as directors.

CHICAGO, ILL. — Raster Carbon Rheostat Company has been incorporated; capital, $10,000; manufacture general electrical apparatus and goods; incorporators, Edwin Raster, George W. Rogers, Ferdinand Heiss.

### Business Troubles.

CHELSEA, MASS. — Massachusetts Manufacturing and Electric Supply Company reported to have made an assignment.

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The Metropolitan Electric Light, Heat and Power Company, of New York city, has been incorporated. It proposes to manufacture and use electricity for producing light, heat and power, and for lighting streets, parks, etc., in New York city. The capital stock is $25,000, consisting of shares of $100 each. The directors are: Albert Reynaud, of New Dorp, S. I.; Ernest G. Wightman, of Stapleton, S. I., and Robert Emmet, of New York city.

### Portable Milliammeters for Alternating-Current Circuits.

The ELECTRICAL REVIEW is in receipt of a communication from the Keystone Electrical Instrument Company, of Philadelphia, in which they announce the above novel instrument. They state that something over a year ago they received a request from the committee on meters of the American Electro-Therapeutic Association to design and submit for test a portable milliammeter for use on the sinusoidal alternating and faradic-current circuits. The solution of the voltmeter problem was quite simple and the requirements were fully met by their portable voltmeter for direct and alternating-current circuits, but the designing of a portable milliammeter for this class of work presented a very novel problem. After several months' careful experimenting, they succeeded in perfecting an instrument which practical test proved to be eminently satisfactory. The report of the committee on meters, presented at the annual convention of the American Electro-Therapeutic Association, held in Harrisburg last September, contained an unqualified approval of this instrument and, as the result of their tests and investigation, recommended them to the profession. In the course of the experimental work a number of tests were made with the milliammeter, and some data obtained on commercial apparatus which heretofore had only been obtainable by calculations. Among other things tested was the current consumption in the primary coils of transformers when the secondary was in open circuit, thus determining directly and without calculation the idle losses in the transformer system. The result of the test showed the very great difference in what might be termed the idle efficiency of transformers of various makes, and further showed a marked difference between new transformers and transformers in which the iron had aged as the result of several years' continuous use.

The whole question is one of more than passing interest to central station managers who employ the alternating current, and careful tests of the amount of current required to energize the primary coils of transformers when the secondary is in open circuit would, no doubt, lead to a more careful selection of transformers and the replacing of many which have outlived their usefulness. Direct reading in such matters is far superior to calculation, and it is probable that many stations would discover unexpected losses by making a series of tests on the transformers now on their lines.

The instrument itself is neatly designed and mounted in a polished mahogany case, its calibration is carefully made and its indications, the makers say, may be relied upon as perfectly correct.

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Christian Burkhardt has purchased James A. Andrew's interest in the Hudson electric light plant and Willow River water power, at Hudson, Wis., for $30,000.

# Kindred.... ...Interests

**The factory** of the Beacon Lamp Company, at New Brunswick, N. J., is running overtime to meet the unusually large demand of the season for the "Beacon" lamp.

**The new boiler-house** which is being erected by the Waterbury Buckle Company, of Waterbury, Ct., will have a roof of corrugated iron supported on steel trusses. The building is 36 feet wide and about 48 feet long, having brick side walls. Every effort is being made to make this building fireproof. The steel work is being furnished and erected by the Berlin Iron Bridge Company, of East Berlin, Ct.

**The Central Electric Company,** of Chicago, is sending out handbills offering $100 reward for the conviction of any man who can offer a better line of electrical supplies than several of their well known salesmen. The handbills contain portraits of these men, with a description following. They are all described as being about as tall as three-fifths of a length of Interior conduit, and weighing about the same as an 80-light transformer. It is a taking idea, and should be of considerable service to the Central Electric Company.

**James G. Biddle,** of Philadelphia, is sending out a very interesting and well prepared pamphlet, entitled "Concerning X-Ray Apparatus." Mr. Biddle has also prepared a complete revised price-list of X-ray apparatus, which will be sent free to any one upon request. The pamphlet referred to contains considerable information of value on X-ray matters, and also mentions the fact that in Mr. Biddle's office in the Drexel Building there is exhibited a comprehensive working set of up to-date X-ray apparatus. Physicians are especially invited to examine the display.

**Meysenburg & Badt (Incorporated),** brokers, contractors and engineers, have established themselves in the Monadnock Block, Chicago. They announce that they are the duly authorized representative of several first-class electrical concerns, among these being the Weston Electrical Instrument Company, Hugo Reisinger, importer of "Electra" Nuernberg carbons, and the Helios Electric Company. The firm emphasize the fact that they are not supply dealers, but the direct representatives of the manufacturers. They intend to keep in close touch with customers, and will assist them in any way possible.

**The Western Electric Company,** Chicago and New York, is placing upon the market an ornamental inclosed arc lamp similar in style to their standard inclosed arc lamp, but finished in polished brass. The features of this inclosed arc lamp have placed it in the front rank. The name "Economy," which this company has adopted for their specially prepared carbon battery, has become well known among contractors, owing to the efficiency of the battery. The Western Electric non-sparking brush, which is manufactured by this company, is made under Letters Patent No. 419,660, granted to Ludwig Gutman, and is composed of a composition of high and low-resistance metals.

**One of the largest orders** for arc lamps in New York city that has been offered for competition was given on the 16th instant, by R. H. Macy & Company, to the Diehl Manufacturing Company, of Elizabethport, N. J. They are to furnish their new inclosed arc lamp No. 207, which was put on the market about October 1. It is of special design, having a new oxodized finish that has never before been accomplished in the manufacture of arc lamps. By the use of this finish the lamp can be cleaned with a damp cloth at any time, and always retain its original high polish, thus obviating the necessity of burnishing the metal. This lamp was selected after one of the closest tests in competition with other manufacturers that has occurred in the East, several lamps having been in competitive test for over a month, and it is undoubtedly of interest to the trade to know that the Diehl Manufacturing Company have been awarded the contract after such an exhaustive investigation into the merits of their lamps.

### The Jandus Arc Lamp Catalogue.

The Jandus Electric Company, Cuyahoga Building, Cleveland, Ohio, has just prepared one of the handsomest arc lamp catalogues ever brought before the electrical fraternity. The illustrations and press work are of the highest type, and the arrangement of the text is highly artistic. The body of the catalogue is printed in two colors, and the cover, which is especially attractive, is embossed and printed in three colors.

The Jandus Electric Company has also made an official announcement to the effect that it is the sole owner of the patents of William Jandus and the sole manufacturer of the inclosed arc lamps made under those patents and heretofore sold as "Manhattan" arc lamps. The company has organized a sales department, and will hereafter sell the lamps directly to agents, dealers or customers, instead of marketing its products through a general sales agency.

New designs have just been placed upon the market, and the whole field of arc lighting is covered by the various styles and forms of Jandus lamps. These include lamps for constant potential, constant current, alternating current, 220-volt lamps, railway lamps, and several styles of short arc lamps. All these are thoroughly illustrated and well described in the new catalogue mentioned above. This will be sent to any reader of the ELECTRICAL REVIEW free on request.

### The Norwegian Mica Company.

The Norwegian Mica Company, of Christiania, Norway, began business on November 6. The company is working mica mines in Norway. Connected with the company are the professor of mineralogy at the University of Christiania, Johan H. L. Vogt, and a civil engineer of Christiania, Mr. Henry E. Mohn, who is president of the company.

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Contents: Design and Construction of City Lines.
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New. Price, $1.00.

**"HOW TO MAKE AND USE THE TELEPHONE,"**
BY GEO. H. CARY.
The purpose for which this book is written is to furnish information to those who may desire to construct or use telephones. telephonic apparatus or lines on a small scale.
Price, $1.00.

**"TELEPHONE TROUBLES AND HOW TO FIND THEM."**
BY C. E. HASKINS.
A practical little treatise for telephone inspectors, exchange managers, and employés who are not electrical experts, as well as the general public, who use telephones or private lines.
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# Electrical.... Patents.

[Specially reported for this journal by E. S. Duvall, solicitor of patents, Loan and Trust Building, Washington, D. C. Copies of any patent may be secured for 10 cents each.]

ISSUED NOVEMBER 9, 1897.

593,372 Telephone system; W. W. Dean, St. Louis, Mo.

593,388 Constant-current dynamo; C. N. Black, New Haven, Ct.—An open coil, constant-current dynamo, having the terminals of its individual bobbins or sets of connected bobbins connected to segments of different commutator rings.

593,389 Electrically-actuated switch mechanism; W. S. Browne, Brooklyn, N. Y.

593,394 Multiple switchboard system; F. C. Hughes, Detroit, Mich.

593,424 Trolley pole and stand; F. A. Seaver, Hartford, Ct.

593,434 Device for opening elevator doors; Jos. Rice, Chicago, Ill.

593,442 Joint or coupling for electric cables; G. Tailleur, Chicago, Ill.—The combination with conductor cable ends of interlocking terminals, insulating sleeve connected to said conductors and having opposing flanged ends and a two part coupling engaging the flanged of said sleeves and serving to hold the terminals and sleeves together.

593,456 Workman's time recorder; F. Brook, Huddersfield, England.

593,467 Tip for telephone cords; J. W. Gottschalk, Philadelphia, Pa.—The combination of an electrical conductor, a pin and a clamp having a perforated end slipped over the pin, with means for holding the clamp onto the electrical conductor.

593,470 Motor-vehicle; H. W. Heaton, Olneyville, R. I.

593,481 Automatic circuit-breaker; W. G. Lowrie, Newark, N. J.—The combination of a source of electric energy, a magnetic field created thereby, a circuit-breaker controlled by the magnetic field, and means for short circuiting the field and breaking the circuit when the current exceeds a certain strength.

593,504 Automatic block-signal; J. W. Williams, Danville.

593,510 Electric circuit controller; J. W. Bowley, Washington, D. C.

ISSUED NOVEMBER 16, 1897.

593,559 Storage battery; E. A. Barber, Watertown, N. Y.

593,571 Magnetic clutch; T. J. Fay, Brooklyn, N. Y.

593,599 Bogie-truck motor car; J. F. McLaughlin, Philadelphia, Pa.—The combination with a bogie-truck car, with a clutch or clutches for applying power to the driving axle or axles, and operating mechanism swiveled at or near the pivots of the truck, whereby it is unaffected by the turning of said truck.

593,611 Multiple switchboard system for telephone exchanges; C. E. Scribner, Chicago, Ill.

593,612 Toll counter for telephone lines; C. E. Scribner, Chicago, Ill.—The combination with two telephone lines connected to form a compound circuit between two sub stations through a central station; of a registering device associated with each, and means, substantially as indicated, for actuating the said registering device of the initiatory line and for maintaining quiescent that of the called line.

593,613 Polarized signal bell; C. E. Scribner, Chicago, Ill.

593,614 Telephone system; C. E. Scribner, Chicago, Ill.

593,625 Insulated hanger; E. P. Warner, Chicago, Ill.

593,626 Electric arc lamp; E. P. Warner, Chicago, Ill.—In a friction clutch, the combination with a movable element or clutching members rotatably mounted one at either side thereof, and link connections between said members, whereby independent rotation of one of said members varies the distance between them, causing engagement or release of said movable element according to the direction of such rotation.

593,627 Telephone; John Weil, Mansfield, Ohio.

593,689 Insulator; L. F. Rembe, Haverstraw, N. Y.

593,692 Electric signaling mechanism; L. G. Rowand, Camden, N. J.—In combination, a normally closed circuit, a magnet upon said circuit, a second circuit having a signal or signals thereon, a switch comprised of two members, one of which is moved by the magnet in one direction, and means independent of the magnet to move it in the other direction, and means to hold the second member of said switch out of alignment with the first-mentioned switch member, when moving under the action of the magnet.

593,694 Machine for perforating paper; H. W. Shonnard, New York, N. Y.

593,697 Electric arc lamp; C. A. Stirling, Hartford, Ct.

593,716 Alternating-current motor; A. J. Churchward, Brooklyn, N. Y.—In an alternating-current motor, a compound field magnet for synchronous operation, excited in part by continuous current taken directly from a direct or continuous-current winding of the armature, adapted for self-starting, and in part by current passing through the armature and rectified.

593,718 Electrically-driven gas machine; T. J. Fay, Brooklyn, N. Y.—The combination of a sealed gas casing, an electric motor located outside thereof, and whose field magnet system itself forms a sealed casing, and a sealed gas passage connecting the motor and casing together and through which the armature shaft leads.

593,720 Telephone toll station; Wm. Gray, Hartford, Ct.

593,737 Heating and ventilating device; E. A. Corbin, Philadelphia.—The combination of a radiator situated in a room or apartment, of a casing inclosing the radiator and provided with a fan opening, and a fan arranged at said opening, the said casing being adapted to be thrown open at the top thereof.

593,738 Electric arc lamp; W. C. Coughlin, Worcester, Mass.

593,803 Electric battery; W. W. Hanscom, San Francisco, Cal.—The method of constructing elements for storage batteries, consisting in mixing lithargy and sugar, settling the same by adding sulphite of ammonia, dissolving out part of the sugar and electrolytically reducing to spongy lead.

593,808 Motor; W. E. Lippincott, Allegheny, Pa.

593,817 Rheostat; G. J. Schneider, Detroit, Mich.—The combination with circuit-closing switch and the movable contact with a rheostat, of a time motor for actuating said movable contact to cut-out resistance adapted to be started upon the closing of the switch, and means for compelling the return of said movable contact before the opening of said switch.


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TREASURY DEPARTMENT, WASHINGTON, D. C., October 23, 1897.—Sealed proposals will be received at this Department until 2 o'clock P. M., November 30, 1897, for installing an electric light and power plant in the Post Office Building, Washington, D. C. Proposals will be received as follows: 1. For tubing and wiring the building. 2. For dynamos and engines. 3. For the plant complete. Proposals must be accompanied by certified checks, drawn to the order of the Treasurer United States, as a guarantee of good faith. The amount of the checks, together with other requirements relating thereto, is fully set forth in the specifications of the Department. The right to reject any and all bids, and to waive defective bids, is reserved by the Department. Specifications and plans can be obtained upon application to the Chief Clerk, Treasury Department. Proposals should be addressed to the Secretary of the Treasury, and indorsed: "Proposals for Electric Light and Power Plant, Post Office Building, Washington, D. C." O. L. Spaulding, assistant secretary.


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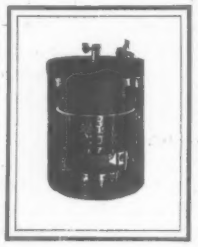

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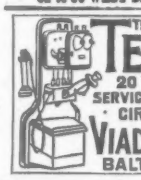

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